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ABSTRACT

Using "A Model of the Functions of Master Instructor" (HumRRO-TR-73-23) as a guide, procedures and materials for training Army instructors to improve their classroom effectiveness were developed. In constructing the model, various materials on instructor characteristics and responsibilities in four main areas (training programs, classroom behaviors, professional growth, and innovative practices) were gathered from civilian and military sources. Special attention was given to materials devoted to classroom management techniques. Each of the 40 tasks described in the model was carefully reviewed considering three aspects: performance situation, kinds of information needed, and sources of information. The report elaborates on the activities and experiences an instructor would undertake to acquire or update the skills described in the model. The main emphasis is on description of recommended activities to be undertaken in connection with the performance of each instructor task cited in the model. The document concludes with a 12-item bibliography and five appendixes: a model of the functions of a master instructor, a sample system analysis, a sample of matrix terminal and enabling objectives, a sample observation form, and videotaping objectives. (Author/BP)

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Improving the Classroom Performance Of Army Instructors

William H. Melching and Susan M. Larson

HUMAN RESOURCES RESEARCH ORGANIZATION
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May 1975

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Using *A Model of the Functions of a Master Instructor* (HumRRO-TR-73-23) as a guide, procedures and materials for training Army instructors to improve their classroom effectiveness were developed. This report elaborates on the activities and experiences an instructor would undertake to acquire or update the skills described in the model. The main emphasis is on description of recommended activities to be undertaken in connection with the performance of each instructor task cited in the model.

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SUMMARY AND CONCLUSIONS

PROBLEM

In a previous HumRRO report, *A Model of the Functions of a Master Instructor* (TR 73-23), suggested characteristics of effective teaching were identified and fashioned into a model. While the model specified a set of instructor tasks thought to contribute to effective classroom performance, it did not specify the activities in which an instructor might engage to obtain the desired proficiencies.

This report defines those activities in order to provide Army schools with general guidance in selecting and structuring experiences that will assist instructors in implementing the instructor model in any instructional situation where there is interaction between instructor and student.

APPROACH

As in constructing the model, various materials on instructor characteristics and responsibilities in the four main areas—Training Programs, Classroom Behaviors, Professional Growth, and Innovative Practices—were gathered from civilian and military sources. Special attention was given to materials devoted to classroom management techniques.

Each of the 40 tasks described in the model was carefully reviewed. Then, a description of suggested activities to be undertaken by the instructor when performing each task was developed. Three aspects of each instructor task were considered: Performance Situation, Kinds of Information Needed, and Sources of Information. It was felt that this division would facilitate learning how to perform each task, since the instructor can readily find the circumstances under which the task must be performed, some questions to ask about critical issues, and the most useful sources of information for resolving these issues.

To provide concrete guidance to school administrators in the construction of instructor training programs, the recommended training events are described in terms of specific *instructor* activities to be learned, rather than in terms of suggestions to administrators planning training.

Included are some activities that would need to be performed by instructors working together rather than singly, and some tasks that may be beyond the jurisdiction of an instructor but about which he needs to be knowledgeable if he is to perform other tasks effectively.

CONCLUSIONS

Following the execution of the effort to provide specific guidance and structuring information for all the 40 tasks in the model, it was concluded that the recommended instructor activities were adequately described and elaborated upon, and that they could be incorporated into ongoing instructor training programs with minimal disruption.

PREFACE

This report describes the results of a research effort undertaken by the Human Resources Research Organization to develop procedures and materials for training and evaluating Army instructors, with the objective of improving their classroom effectiveness.

The work was conducted at HumRRO Western Division, El Paso Office (formerly HumRRO Division No. 5). Dr. Albert L. Kubala was Director when the research was performed. Dr. Howard H. McFann is the current Director of the Western Division and Dr. Robert D. Baldwin is the El Paso Office Director. Dr. William H. Melching served as the Research Leader. Susan M. Larson assisted in the development of this report.

Military support was provided by the U.S. Army Air Defense Human Research Unit, with LTC Frank D. Lawler as the military chief when this research was concluded.

HumRRO research for the Department of the Army for Work Unit CLASSROOM was conducted under Contract DAHC19-73-C-0004. Army Training Research is performed under Army Project 2Q062107A745. The work is conducted under the sponsorship of the U.S. Army Research Institute for the Behavioral and Social Sciences, with Dr. Milton Maier serving as the technical monitor.

Meredith P. Crawford
President
Human Resources Research Organization

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Improving the Classroom Performance Of Army Instructors

BACKGROUND AND PROBLEM

An earlier HumRRO research effort[1] resulted in development of a model of the functions of a "master instructor"—a term used to connote an instructor who can perform a broad range of instructor functions. Focusing on four areas of instructor responsibility—Training Programs, Classroom Behaviors, Professional Growth, and Innovative Practices—the model described 17 main functions, which were analyzed into 40 instructor tasks.

It was believed that the model provided an adequate and valid description of the behaviors performed by a person with wide instructional capabilities. However, it did not specify the training an instructor should undergo to acquire those capabilities. To increase the likelihood that the model would be implemented by agencies engaged in training and evaluating Army instructors, the development of guidance documents for that purpose seemed advisable.

It is the purpose of the present report to elaborate on the activities and experiences that would enable an instructor to acquire or update the skills described in the model. This report is intended primarily to provide guidance to administrative and supervisory personnel in Army schools and to aid them directly in their efforts to train and evaluate instructors. While not designed explicitly for that purpose, the report may also be used by experienced instructors to improve their own instructional effectiveness.

Although the use of the term "classroom" in the title may imply that the focus of the report is solely on the conference type (lecture/discussion) of instruction, this is not the case. Each instructor task described in the model and elaborated upon in the present report is believed to be a relevant task regardless of how instruction may be presented. As used here, "classroom" refers to any instructional situation in which a live instructor is present during instruction. A key feature of the model is the *capability for interaction between an instructor and the students.*

In some kinds of instruction (e.g., educational television, film strips and audio, slides and audio, textbooks, programmed instruction books), live instructors may or may not be present. Therefore, interaction may not always be possible. In such situations, not all tasks in the model can be performed.

Conference instruction is a prime example of a situation in which a live instructor is present. But so are laboratory classes, on-the-job training courses, and peer instruction, for example. All are learning situations in which there is much opportunity for interaction between instructor and student.

RESEARCH APPROACH

As a first step, various guidance materials from civilian and military areas of instructional technology were accumulated. Specific segments of these materials were set aside to aid development of the report.

[1] William H. Melching and Paul G. Whitmore. *A Model of the Functions of a Master Instructor,* HumRRO Technical Report 73-23, October 1973.

Special attention was devoted to the area of classroom management. From the preceding research effort it was apparent that there was a need in the Army for more effective classroom management techniques. In this report, Contingency Management procedures have been explored for use in military instruction. Such procedures have shown promising results in civilian settings and should improve the capabilities of Army instructors in managing their classrooms.

With the reference sources as back-up aids, each instructor task postulated in the model was carefully reviewed and a description of recommended instructor activities developed. These descriptions outlined what an instructional department might require of an instructor when he was attempting to perform the tasks. For each task listed in the model, the following three aspects were considered:

Performance Situation. The most likely circumstances under which the task must be performed were described. This served to set certain limits or constraints upon what must be done, when it must be done, and the primary impetus for undertaking the task.

Kinds of Information Needed. A number of questions concerning likely relevant issues were listed. The questions do not necessarily cover the entire range of concern, but it is believed they are representative and cover the most highly critical issues.

Sources of Information. Suggestions were made with respect to the most useful sources of information, such as specific personnel, offices, and training literature.

RECOMMENDED INSTRUCTOR ACTIVITIES

The three aspects of instructor tasks were developed to help instructional departments make timely and insightful judgments with regard to the training and practical experience instructors should receive.

The bulk of this report consists of descriptions of instructor activities recommended for performance of each instructor task cited in the model. Instructor task statements have been abbreviated from their original formulation, but the sequence of areas of performance, functions, and tasks exactly follows that given in the model.

A copy of the model, as presented in the earlier HumRRO report,[1] is included in this report as Appendix A. To increase the usefulness of the present document, explicit examples of desired instructor behavior were provided where feasible. In addition, sample products, forms, procedures, and so forth, were included in the other Appendices.

Before the instructor tasks are presented, certain cautions need to be introduced. First, the reader may sense what seems to be a conflict between the intended audience of the report (school administrators) and the apparent focus of the report (instructors). The report is designed to provide guidance to school administrators in the construction of instructor training programs. To make this guidance as concrete as possible, the recommended training events are described in terms of the activities and experiences an instructor might undergo in acquiring the needed skills. In other words, the guidance is directed not at suggesting specific administrator activities but at describing specific instructor activities.

The task for the administrator, then, is to provide training situations that make it possible for the instructor to engage in the recommended activities. While this is not the conventional kind of guidance one might expect to be given to administrators, it tends to be explicit, objective, and highly job oriented. It has the further advantage that, should an instructor seek on his own to acquire certain of the master instructor skills, he is more

[1] Melching and Whitmore, *op. cit.*

likely to be able to do so because the recommended activities pertain directly to what *he* must do, not to what an organization or an administrator must do.

A second caution. One should not expect the functions and tasks to be performed by one instructor working in isolation. This reiterates a view expressed in the previous report about the model,[1] where it was suggested that, at least for certain tasks, iinstructors should pool their skills and divide the work. Thus, even though the description of .nstructor activities presented in the present report may imply that the instructor should be able to perform them without aid, this is not necessarily the case.

Furthermore, it should be noted that some of the tasks listed may not be within the jurisdiction of the instructor; they may be accomplished by higher authority or made the responsibility of some other person in the instructional or administrative chain. However, the instructor still needs to be knowledgeable about the rationale and the content of these tasks in order to work effectively in related tasks that are his personal responsibility. Therefore, the activities in all of the task descriptions are presented as if they were being performed by the instructor, since—at the least—he should receive information about them during his instruction.

In the remainder of the report, the suggested activities an instructor might engage in to acquire the identified skills are described. The list of instructor tasks follows the sequence given in the model, the description beginning with the first task in Area I.

Area I: Training Programs

A. Determine the existence of an instructional need.

1. Analyze a performance discrepancy in an existing system.

Performance Situation. The suggestion or declaration that a performance discrepancy exists is most likely to originate from some source within an operating (target) system. For example, a field commander charged with operating a weapon system may lodge a complaint that personnel newly arriving at his command cannot perform the functions assigned to them. These personnel may have been specifically trained to perform functions in this system, or they may have had no formal training in the system. On the basis of his evidence, the complainer may request that, in the future, personnel be given specialized instruction. He may also describe the nature of the instruction that he believes should be given, or the kind of performance that personnel must demonstrate.

Kinds of Information Needed. The basic problem confronting the instructor in this instance is to identify the performance discrepancy. Answers to the following kinds of questions are needed:

- What is the specific nature of the discrepancy?
- Is it a knowledge deficiency?
- Is a skill level too low?
- Is a skill missing completely?
- Is it both a knowledge and skill deficiency? Several skills?
- How severely does the discrepancy impact on system functioning?

[1] *Ibid.*

Sources of Information. It is quite likely that a formal report was prepared by the field commander or his staff, and this report should be examined in detail. It will contain not only pertinent information about the nature of the discrepancy, but also information helpful in identifying persons who may be knowledgeable about it.

In this situation, the most pertinent sources of information are personnel in the operating system. The instructor should contact them in person, but if this is not possible, the mails or the telephone may be used.

In addition to the commander and his staff, other personnel in the command may be important sources of information. Who they are will depend on the system, the discrepancy, how the command is organized, and so on. The instructor will need to ferret out these other sources of information while conducting the initial interviews.

The instructor should also refer to training materials and directives that may have been generated to guide previous training in the target area. Appropriate instructor personnel should be consulted if possible.

2. *Given a new system, determine the probability that there is a need for formal instruction.*

Performance Situation. A new system has been introduced, tentative or possible human functions have been enumerated, and now it is necessary to decide whether formal instruction must be prepared. Directions to perform this task may come from personnel who anticipate operating the system, from some higher authority within the instructor's department, or some related authority.

Kinds of Information Needed. To make a preliminary analysis of skills likely to be needed, questions like the following should be answered:

- What skills must an individual possess to perform satisfactorily in the new system? How many different kinds of skills (or job positions) are needed?
- What knowledge must persons in these positions possess?
- Is there a population of individuals who already possess the required knowledge and skills?
- From the point of view of probable human functions, how similar is the new system to existing systems?
- What are the main differences in human activities between an existing system and the new system? Can critical differences be identified?
- Could an individual acquire the needed knowledge and skills through on-the-job training?

Sources of Information. Important sources of information would include the developer of the hardware portion of the system. Of particular interest would be any literature or documents that describe how to operate and maintain the hardware. From these sources many important maintenance functions can be determined.

The designers of the system can be contacted to obtain information relevant to human functions. Having conceived and constructed the system, they should be fruitful sources of information.

B. Perform a system analysis.

1. Analyze an existing system, placing emphasis on human functions.

Performance Situation. Following the establishment of a performance discrepancy of an existing system and a command decision to generate instruction to remove the discrepancy, the system is analyzed to identify functions requiring formal instruction. The analysis should not extend beyond this point.

Kinds of Information Needed. This task is an extension of the task designated under Area I, Function A, as: "1. Analyze a performance discrepancy in an existing system." Therefore, the extent of the information needed at the present point will depend on the inclusiveness of the information already obtained. In addition to the information needs cited in the "Information Needed" section of that task, answers to the following questions may be needed:

- How complex are the functions to be acquired? What length of training time is likely to be required?
- Will trainees need opportunities to practice the performance of particular tasks?
- Must a trainee's performance be integrated with that of others? Are special training environments required?
- How feasible would it be to correct the discrepancy through on-the-job training?
- If OJT does not appear to be adequate, how feasible would it be to modify an existing course?

Sources of Information. The most pertinent sources of information are likely to be personnel in the operating system as described in "Sources of Information" under Task I.A.1., which the reader should review.

2. Given a new system in which man must be trained to perform, analyze the system.

Performance Situation. In this situation it has been acknowledged (or directed) that the new system will require human assistance. Tentative human functions have been enumerated under Task I.A.2., and it has been determined that formal instruction is required. The present task is directed at obtaining more definitive information about the total system—its mission, components, functions, constraints, operating environments, and so forth. In listing out these several system aspects, the instructor must make a special effort to identify those *human* functions that will probably require formal instruction. As with Task I.A.2., directions to the instructor to perform this task will probably come from personnel who anticipate operating the system, from some higher authority within the instructor's own department, or from some related authority.

Kinds of Information Needed. No attempt will be made here to cover the detailed procedures of system analysis. They are adequately documented elsewhere.[1] Instead,

[1] A. James McKnight. "Establishing Performance Requirements," in *An Experimental Program of Instruction on the Management of Training*, Haggard, Donald F., Willard, Norman, Jr., Baker, Robert A., Osborn, William C., and Schwartz, Shepard, HumRRO Technical Report 70-9, June 1970, pp. 286-301.
Robert G. Smith, Jr. *The Development of Training Objectives*, HumRRO Research Bulletin 11, June 1964.

general guidelines on information needs are offered, along with a specific example of an analysis (Appendix B). Answers to the following questions will help provide typical information needs:

- What is the prime mission of the system? What subordinate missions can be identified? What criteria of mission success are to be used?
- What components comprise the system?
- What functions must these components perform? What human functions are required?
- How many different kinds of job positions are likely to be involved?
- What system constraints are presumed to be in effect? In what environments must the system operate?

Sources of Information. Since this task is an extension of that described under I.A.2., information sources will probably be the same. They include system design data and documents, which should have pertinent information, and the developer of the hardware portion of the system, who should be able to provide much needed information.

The reader is encouraged to review the specific example of a system analysis given in Appendix B. However, it should be emphasized that system analysis formats vary and may differ from the one represented here. For example, this one does not employ separate headings for designated human functions, but states them briefly under each identified job position.

C. Determine performance requirements.

1. Given results of a system analysis, develop a set of tentative performance requirements.

Performance Situation. In this situation the instructor has the results of a system analysis (whether for a new or existing system), and now wishes to examine prospective human functions. The instructor lists the performance requirements that the individual must be able to satisfy in order to perform effectively on entering the operating system. These requirements could include not only psychomotor skills, but also certain knowledges, attitudes, interpersonal skills, and other capabilities. There is a need for valid information to guide the design of needed instructional programs.

Kinds of Information Needed. Answers to the following questions will provide critical information:

- For each identified human function, what skills must the individual presumably possess?
- What information or knowledge is presumed necessary to perform each function?
- Are attitudes and interpersonal skills of consequence in the performance of any function? Describe them as explicitly as possible.

Sources of Information. The goal of this task is to generate as comprehensive a set of *tentative* performance requirements as possible. At this point the instructor should not attempt to identify only valid requirements. Rather, the aim is to "brainstorm" the problem, that is, hypothesize performance capabilities in a relatively uncensored fashion

to tap the full range and scope of possible requirements. It is hoped that this approach will significantly lower the chances of overlooking subtle but critical requirements.

The instructor himself may be one of the most useful sources of information. Previous experience in analyzing functions and preparing instructional programs should enable him to offer many ideas on needed skills, attitudes, and knowledge. Similarly, other instructors may be invited to brainstorm the problem and offer their judgments.

This does not imply that non-instructional personnel such as the developers and intended users of the system would not be relevant sources of information. These individuals should be consulted, but primarily to aid in substantiating performance requirements.

2. *Given a set of tentative performance requirements, substantiate the requirements.*

Performance Situation. Since this task is a direct extension of the previous one, the performance situation is essentially unchanged. The only difference is that the instructor now possesses a number of tentative requirements, whose validity needs to be confirmed. The rationale for dividing the function "Determine Performance Requirements" into two tasks is that the instructor can more easily obtain detailed and valid opinions from system developers and users by asking them to select requirements from a list of requirements rather than by asking them to generate their own statements of requirements. The same rationale led to the suggestion that the instructor produce the comprehensive set of tentative requirements cited under the previous task.

Kinds of Information Needed. The instructor wants to obtain the opinion of system experts on the need for each skill, knowledge, attitude, and so forth listed in the set of tentative performance requirements. To obtain this information, a special questionnaire might be constructed and administered to selected individuals. The set of tentative skills, knowledge components, for each function and so on, might be listed, and the respondent asked to make a judgment respecting each item. A suggested form for the questionnaire is shown in Figure 1.

In the example the respondent must decide for each listed capability whether it is Critical, Perhaps Helpful, or Not Necessary. These judgments would be made for all capabilities listed for all functions. The respondent would be encouraged to add

FUNCTION "A"

Capability	Critical	Perhaps Helpful	Not Necessary
Skill 1			
Skill 2			
Knowledge 1			
Knowledge 2			
Knowledge 3			
Attitude 1			

Figure 1. **Example of Skill Judgment Questionnaire**

capabilities not included on the list if he felt they were critical. Suggestions on using questionnaire data are given in the next section.

Sources of Information. Naturally, the instructor would like to administer the questionnaire to those persons who are most knowledgeable about the system—especially about the required human performance. System designers and developers, personnel currently functioning in the system, and personnel already engaged in training individuals who will enter the system can be the most relevant sources.

Ideally, questionnaire results would be unequivocal, with the respondents agreeing among themselves on each judgment. Then the instructor would have to make no decisions other than whether to include as a requirement each item judged Perhaps Helpful. More likely, however, a situation exists in which agreement among the respondents is limited.

The instructor might elect to develop a decision rule for guidance. For example, with questionnaire results from nine respondents, the judgment might be accepted as final for each item on which the mode was five. Thus, if five respondents judged an item as Critical, two judged it as Perhaps Helpful, and two as Not Necessary, the instructor would accept the item as a substantiated performance requirement. Similarly, if the mode fell under Not Necessary, he would reject the item. In other instances, where the mode either fell under Perhaps Helpful, or was less than five, special decision rules would need to be formulated. Such procedures represent one way in which the instructor could make efficient use of the opinions of several system experts.

D. Evaluate capabilities of entering students.

1. Based on performance requirements, devise test items to assess capabilities of students scheduled to enter training.

Performance Situation. This task and the two following might be performed at other points in the systems engineering cycle. However, they are introduced here, immediately prior to the function of developing instructional objectives, because the assessment information obtained may have a particular impact on objectives. Briefly, three inter-related purposes can be cited for assessing the capabilities of students scheduled to enter training:

First, prevent or reduce duplication in instruction. Little is to be gained in instructing students in required knowledges and skills they already possess. Of course, if the present level of student proficiency in these behaviors is clearly inadequate, duplication may be justified. The point is that such duplication should be done purposefully, not unknowingly.

Second, assess student capabilities to identify knowledges and skills that must be acquired, if not already possessed. Obtaining information about required behaviors that students already possess, as well as those they do not possess, helps to avoid redundancy and focus attention on needed behaviors.

Third, provide useful information regarding possible instructional strategy. To be maximally useful, this strategy must be sensitive to the individual characteristics and capabilities of the students. For example, if the students are known to have certain gaps in the knowledge essential to a given skill, the instructor may decide to organize instruction so as to facilitate acquisition of the missing knowledge.

It should be obvious that assessment data will be most useful when instruction is individualized. Having identified specific deficiencies in specific students, an instructor

can use the information to devise learning experiences directed at correcting each unique situation. The use of assessment data, however, is not limited to individualized instruction, for such data can provide useful insights in any instructional situation.

In the performance situation, then, the instructor has information about the requirements of the target system and wishes to determine which requirements (capabilities) are already possessed by the students who are scheduled to enter training (the delivery system). It is assumed that such students are either already available or can be made available for the assessment.

Kinds of Information Needed. The information needs are pretty straightforward: Which of the stated requirements does the student already possess? The previous task produced a set of "critical" requirements. Now the instructor may wish to devise a test to assess the student's possession of these requirements. For instance, the test could assess each student's knowledge of concepts and terms used in the target system, or his ability to perform certain skills or operations required by the system. Items are needed that test the student's present knowledge and skill respecting the target system requirements.

Sources of Information. If students are to undergo training for a system in which certain training materials—and tests—already exist, these materials and tests may be convenient sources of information. An existing final examination, for example, may be an excellent source of test items. If no course materials or tests can be found, the main source of information may be the previously developed set of critical performance requirements. With the aid of a textbook on test construction,[1] possible items to assess capabilities of entering students may be developed.

2. Administer the assessment test to entering students.

Performance Situation. Once test items have been developed, students must be found to take the test. Student availability is probably dependent on local customs and regulations. In some installations an instructor may have no access to students until they enter the classroom on the first scheduled day. In other instances, students may be available for limited times during orientation periods. In either case, the instructor may be able to administer the test to at least a portion of the entering students. Ideally, the test should be administered sufficiently in advance of the course for the instructor to be able to take the results into account in preparing the instruction.

Kinds of Information Needed. Perhaps the only information needed here would include matters such as:

- Number of students available for testing and whether they are available in one large group or in several small groups.
- Length of time students will be available.
- Place where students could be tested.
- Date(s) and time(s) at which testing could be scheduled.

Sources of Information. While in-processing procedures will differ from one training establishment to the next, each will doubtless have an office that schedules activities of incoming students and controls their availability. Individuals from this office would probably be the most useful sources of information.

[1] For example: Dorothy A. Wood. *Test Construction: Development and Interpretation of Achievement Tests*, Charles E. Merrill Books, Columbus, Ohio, 1960.

3. Evaluate results of assessment test.

Performance Situation. This task is dependent on prior completion of the previous two tasks. The general goal is to assess student capabilities in the light of stated performance requirements. To do this, the instructor needs a list of the requirements and a set of associated test items.

How extensive this task turns out to be may depend on the number of students on whom the instructor can obtain test data. In general, the greater the number of students, the greater the chances of obtaining helpful information. However, large numbers of students may be a mixed blessing, since an excessive amount of time may be needed to score papers or otherwise evaluate performance. Also, it is highly probable that after 20 or 30 students are evaluated, no new information will be obtained. So an argument can be made for sampling from the population of incoming students rather than attempting to test them all.

Kinds of Information Needed. Armed with the materials cited, an instructor would seek answers to the following questions:

- What specific knowledge or facts do students possess that (presumably) is critical or perhaps helpful in satisfying performance requirements?
- What representative knowledge or facts in this regard do students not possess?
- Which of the required skills can students perform now? At what levels of competency?
- What critical attitudes do students possess? Or not possess?

As students will probably not be uniformly able to perform the listed requirements, a probable outcome will be something like this:

Performance Requirement	Proportion of Entering Students Already Able to Meet Requirement
Knowledge 1	.76
Knowledge 2	.13
Knowledge 3	.95
Knowledge 4	.61
etc.	etc.

While a large proportion of the students possess knowledges 1 and 3, some students apparently do not. So what are the implications for the instructor? Perhaps the most immediate one is that the use of a cut-off procedure may be helpful. For example, in deciding on the content of the instructional program, the instructor might decide to provide no instruction for those performance requirements on which 90% or more of the students demonstrated a satisfactory score. This would mean that 10% of the students would not have their instructional needs served; on the other hand, using the cut-off would reduce the number of instances in which students were instructed in capabilities which many already possess.

The long-term implication would seem to be to emphasize the merit of providing individualized instruction. Ideally, only the instruction that each student needs and can

effectively use should be provided. No one seriously challenges this view; the only problem is how to bring it about. However, individualized study, while important, is not a matter of direct concern at this time. The main goal now is to make sure the instruction reflects existing capabilities, reducing or preventing redundancy in instruction and giving some insights into possible instructional strategies. In short, the instructor should prepare instruction that would be appropriate for many groups of students who presumably possess similar capabilities.

Sources of Information. The test results are the primary, if not the only, sources of relevant information. Of course, if instructional materials already exist, the instructor will need to examine them and also consider modifying them in light of the test results.

E. Specify instructional objectives in behavioral terms.[1]

1. Prepare terminal performance objectives.

Performance Situation. This task should be undertaken anytime a new course of instruction is being prepared or an existing course is being revised. In either case, the instructor must have available the requirements a trainee must meet in order to function effectively in the target system as well as definitive information about existing capabilities of students entering training (delivery system). The goal is to develop terminal instructional objectives, which, while based on the stated performance requirements, also reflect the existing capabilities of entering students.

Kinds of Information Needed. To perform this task the instructor needs to possess a set of particular skills. Specifically, the instructor must be able to:

(1) Derive terminal objectives. Here the instructor needs the list of performance requirements and the information about existing capabilities of students. Since all stated requirements are presumably critical (see section C. 2.), the only ones that may be eliminated are those already possessed by students (see sections D.1., D.2., and D.3.).

(2) Write statements of terminal objectives. Having determined which requirements to include as objectives, the instructor must now rewrite the performance statements so that they become statements of objectives. With respect to the form of objectives, the instructor is encouraged to follow the fairly standard practice of stating the desired student action, performance conditions, and acceptable level of performance. Suggested guidance documents would include Mager[2] and Ammerman and Melching.[3]

[1] The terms used here to describe objectives are not identical with those used in CON REG 350-100-1, but there is no real discrepancy. A *terminal* objective is a statement of the performance expected of a student upon completion of instruction. Thus, it is equivalent to a *training* objective, the term used in the Regulation. An *enabling* objective consists of the component actions, knowledges, and skills the student must learn in order to attain the terminal objective. It is analogous of a *learning element*, the term used in the Regulation.

Terminal and *enabling* objectives are widely used terms in civilian education and in instructional technology in general. Since they represent a convenient way to differentiate job behaviors from learning behaviors, they have been employed in the present report.

[2] Robert F. Mager. *Preparing Instructional Objectives*, Fearon Publishers, Palo Alto, California, 1962.

[3] Harry L. Ammerman and William H. Melching. *The Derivation, Analysis, and Classification of Instructional Objectives*, HumRRO Technical Report 66-4, May 1966.

(3) Differentiate terminal objectives and enabling objectives. To be able to derive, write, and evaluate statements of objectives, the instructor must be able to distinguish between a terminal objective and an enabling objective. Definitions and example of these two kinds of objectives may be found in Ammerman and Melching.

Sources of Information. Perhaps the most useful source of immediate and concrete feedback would be experienced objective writers who would review and critique the instructor's objectives. This would ensure that the products of the newcomers reflect the conception of experienced personnel in the training agency. But if the training agency doesn't have the needed expertise, it must try to develop it in existing personnel. This is where the various guidance documents cited above will prove useful.[1] Once there is a nucleus of experienced individuals, the training of subordinates can proceed.

2. *Prepare a set of enabling objectives for each terminal objective.*

Performance Situation. Once the preparation of terminal objectives has been completed (and judged acceptable by the prescribed reviewing authority), it is necessary to prepare the sets of enabling objectives. As the term implies, enabling objectives refer to skills and knowledges that enable the student to perform the behavior specified in the terminal objectives. They must be prepared so that the instructor can more readily undertake the development of lesson plans and other materials to be used in instructing students. Like terminal objectives, enabling objectives require the instructor to specify the precise student action intended, important performance conditions, and the level of acceptable performance.

Kinds of Information Needed. Just as in preparing terminal objectives, the instructor performing this task needs a set of skills. He needs to be able to derive enabling objectives, write them, and differentiate them from terminal objectives. This kind of information is achieved only through training and practice.

Another kind of information needed is found in answers to questions like:

- What subordinate skills are presumed to be necessary for the individual to be able to perform a given terminal skill? Can component steps and actions be identified?
- What specific knowledges are required? What knowledges do students (probably) possess already?
- Are some tasks not proceduralized and therefore not subject to analysis into subordinate steps and actions? If so, which ones?
- What criteria should be used in judging the adequacy of stated enabling objectives? Some suggested criteria are:

  Directions for performing the desired behaviors should be written at the level of the minimally prepared student.

  Directions should be reviewed and evaluated by other instructor personnel.

  Directions should be tested with individual students.

  Plans should be made to help minimally prepared students acquire information and perceptual-motor skills not now possessed.

[1] Mager, *op. cit.*; Ammerman and Melching, *op. cit.*

Sources of Information. A typical approach to get at enabling objectives is to analyze the task into its component steps and actions. Those components that students can't already perform constitute the learning requirements. References that describe how to perform task analyses would be appropriate sources of information. CONARC Regulation 350-100-1 would be such a reference. Other documents that deal with the criteria and form of stating objectives include Ammerman and Melching[1] and Mager.[2]

Again, an important source of information would be experienced objective writers, as well as individuals within the training agency who are considered to be subject matter specialists or content experts. They should be able to provide valuable information on which knowledges and subordinate skills are vital to the acquisition of terminal behaviors. A final source of information is simply intuition. The writer of objectives who has had experience teaching and preparing instruction can probably depend a good deal on self-guidance. Whether it is adequate will be shown in how effectively students learn the desired behaviors.

F. Arrange terminal and enabling objectives into groups and orders.

1. Arrange terminal objectives into groups.

Performance Situation. This step is performed after both terminal and enabling objectives have been derived; the main goals are economy and effectiveness of instruction. After objectives are developed for a course or a segment of a course, some order or grouping among the objectives will often be obvious. If it is not, this step invites the instructor to examine the objectives and seek to group them in meaningful ways. This may save time and effort when developing training activities, and may also facilitate student learning. If an enabling objective is found to be common to several terminal objectives, for example, there may be no need to teach it more than once. This should be true whether the enabling objective consists of fundamental information, basic perceptual-motor skills, detailed directions for performing a task, or some other underlying support for a terminal objective.

Kinds of Information Needed. As a prerequisite to performing this task, the instructor must have available the sets of terminal and enabling objectives of the intended course. One possible way to explore the inter-relatedness of objectives would be to place them in a simple matrix. Thus, looking at one set of objectives at a time, the instructor might place the terminal objectives along one axis of the matrix and the enabling objectives along the other. To show commonality of need for enabling objectives, he would place x's in each of the appropriate squares. In schematic form, the matrix might look something like Figure 2.

Viewed in terms of common EO requirements, it can be seen that TOs 2, 4, 6, and 8 share the need for EO 1; TOs 2, 6, 7, and 8 share EO 2; and so forth. For a better view, however, we can rearrange the matrix as shown in Figure 3. Then the commonalities will be shown to advantage.

The matrix now shows that TO 3 subsumes the fewest but most common EOs. It only requires one EO to learn, but that EO is relevant to the learning of several other TOs. Thus it might be a candidate for early teaching. TO 5 has 3 EOs, one of which has already been learned. It might be scheduled next. TO 7 also has 3 EOs, and again one was learned previously. Similar conclusions and implications can be drawn from the remaining cells of the matrix.

[1] *Ibid.*
[2] Mager, *op. cit.*

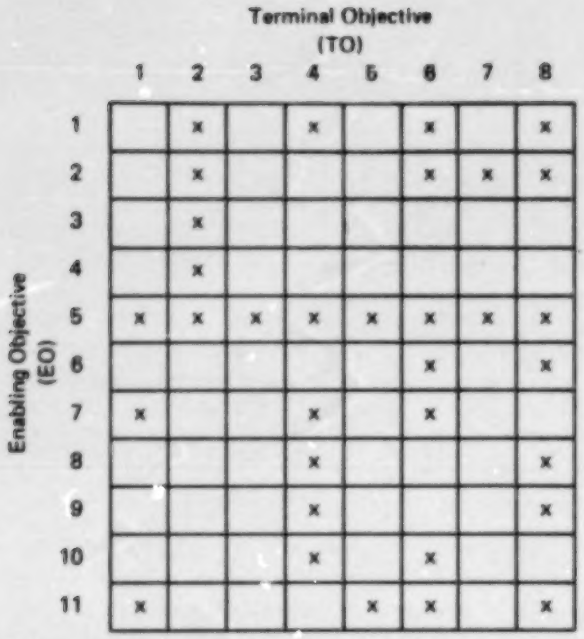

Figure 2. **Matrix Showing Inter-Relatedness of Terminal and Enabling Objectives**

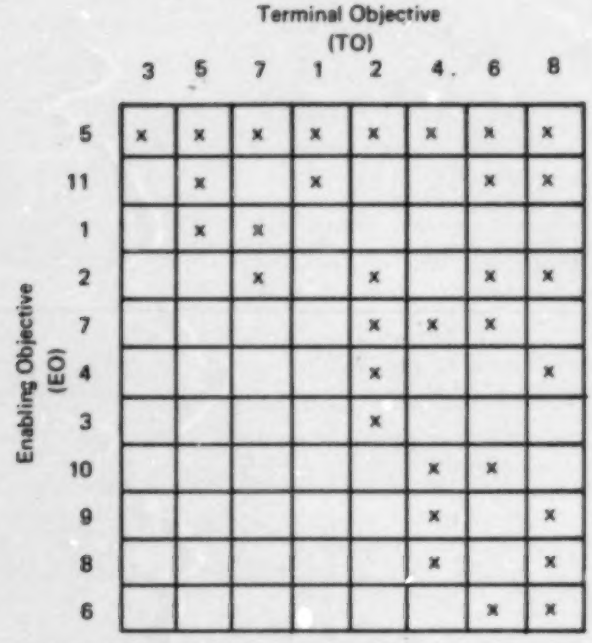

Figure 3. **Matrix Showing Frequency of Objective Commonalities**

An example of a matrix of EOs and TOs in which the objectives are actually stated rather than merely numbered is shown in Appendix C.

Sources of Information. Since the statements of terminal and enabling objectives being examined here were formulated by the instructor, the instructor is the most likely source of information. Also, with the two previous tasks, additional sources of information would be other subject matter experts within the instructional department.

2. Arrange terminal objectives in each group in order of learning difficulty.

Performance Situation. After deciding which terminal objectives tend to form groups, it is necessary to estimate for each group the order of learning difficulty of objectives. Objectives are ordered under the assumption that student learning will be facilitated if the more difficult objectives are postponed until the easier ones are attained.

Kinds of Information Needed. In trying to place terminal objectives in order of learning difficulty, the instructor will need answers to these basic questions:

- Must certain terminal objectives be taught first (or last), independently of presumed learning difficulty? If so, which ones?
- For a given terminal objective, how many enabling objectives have been identified?
- Given a set of enabling objectives, what is the learning order difficulty of the set?
- Based on any previous attempts to teach students the designated behaviors, what information currently exists about the ease or difficulty of the terminal objectives?

In any course of instruction in which several terminal objectives are involved, some objectives must be attained early in the instruction, while others can be attained only during later stages of training. In a course in military vehicle operation, for example, training in the actual operation of a vehicle (Drive a 2 1/2-ton truck in a convoy) will probably be preceded by instruction in procedures for maintaining the vehicle (Perform required pre-operation maintenance). Similarly, in a course designed to enable personnel to maintain electronic equipment, performance of complex troubleshooting will surely follow training in the use of necessary test equipment.

Generally, the more complex the terminal objective, the more likely that it will be accomplished late in the course. To the extent that it appears warranted, then, the instructor should designate those terminal objectives whose sequence or position in the course seem relatively fixed.

In sequencing the remaining terminal objectives, the instructor may attempt to order them on the basis of the presumed learning difficulty of their associated enabling objectives. To do this, the instructor needs information that will facilitate making judgments about the difficulty of such objectives. A direct approach would be simply to estimate the difficulty levels. These estimations need not be complicated; "easy," "moderate," and "difficult" should be adequate.

In addition to making these judgments, the instructor might also find it helpful to count the number of enabling objectives underlying a given terminal objective. If there are many such objectives, it might be assumed that the terminal objective is somewhat complex and difficult to achieve—at least in comparison with a terminal objective possessing only a few enabling objectives. This information could be added to the

estimations described above, thereby letting the instructor make a preliminary judgment of the difficulty order of the terminal objectives. Thus, the instructor might decide to start with the terminal objective that has the fewest, easiest, and most common enabling objectives.

Sources of Information. It should be obvious that estimating the relative difficulty of attaining terminal and enabling objectives is pretty much a judgmental matter. Thus, the more experience the instructor may have in teaching students the designated behaviors, the more definitive the information about difficulty of objectives. The instructor's own experience, then, is a first source of information. However, a writer who lacks this kind of relevant experience may seek guidance from other, more experienced instructors in the department. And if no direct assistance can be provided here, the instructor must start by simply making guesses or estimations. If these guesses later appear to be inaccurate, appropriate kinds of changes can be made at that time. An instructional program should never be viewed as fixed, and if one approach does not work, another should take its place.

G. Implement effective learning activities for each objective.

1. Identify each objective in terms of type of learning function.

Performance Situation. This task is performed prior to the development of specific strategies to aid in attaining student goals. The rationale is that all tasks to be learned by the student can be roughly classified according to the kinds of behavior involved. Once the type of behavior for a given task has been identified, a more effective strategy for instilling that behavior can be located and employed.

Three types of learning functions are suggested:

(1) Information retrieval
(2) Perceptual-motor skill
(3) Complex performance

A discussion of potentially useful strategies to employ with these types of learning functions will appear under the next task. It is sufficient at this point merely to note the types of functions and to remind the reader that the present task is undertaken solely to facilitate accomplishment of the next task.

Kinds of Information Needed. In classifying objectives, the instructor must have clear definitions of the three types of learning functions. The following definitions are proposed:

(1) Information retrieval—A situation in which the student must recall (remember, recollect) particular facts. Cues available to the student to aid in this recall can vary widely. For example, a student might be given the first two factors in a series of three and asked to recall the third one; or the student might be required to recall (list, state) each of ten steps in a procedure. In another situation the student might be required to cite the principles underlying a given solution without the aid of any specific cues.

(2) Perceptual-motor skill—A behavior in which there is a continued motor response to a continued series of stimuli. While this type of learning function can generally be recognized because there is a readily observable overt activity, sensory aspects of the performance (visual, kinesthetic, auditory) are equally important. The latter provide important feedback to the performer, who is thereby able to make appropriate motor adjustments. Driving a truck, tracking an object with a sight, typewriting a letter, using a light pen on a CRT—all are examples of perceptual-motor skills.

It may be noted that these behaviors contain important elements of information retrieval. To typewrite a letter, for example, one must recall the locations of the keys as well as other typewriter control devices. The fact that these kinds of objectives often reflect two learning functions does not deny the usefulness of classifying the objectives. Thus, in developing learning experiences for these behaviors, strategies for both kinds of functions will likely be employed, one for information retrieval, one for perceptual-motor skills.

(3) Complex performance—A behavior that is characterized by multiple components. Obviously, student-learning functions that cannot be classified as belonging to the first two categories must necessarily fall into this one. An example of complex performance might be the activities engaged in by a student while learning how to "start and adjust a generator." In demonstrating proficiency in these activities the student would have to recall the steps to follow in starting the generator, perform each step in the start sequence, recall the cues that indicate optimal generator performance, recall the location and operation of appropriate control devices, and finally, make the necessary adjustments with the control devices.

Sources of Information. If the definitions of the types of learning functions are clear, there is no reason why the instructor should not serve as the main source of information in classifying objectives. If the instructor is in doubt in certain instances, or wishes to have the classification efforts reviewed, the assistance of fellow instructors or the supervisor may be requested.

2. Develop an instructional strategy for each objective.

Performance Situation. This task directly follows the previous one. Once objectives have been classified into types of learning functions, it is necessary to implement the specific strategies by which the instructor will facilitate acquisition of objectives by students.

Kinds of Information Needed. To implement useful strategies, the instructor needs information about possible strategies—especially those that, based on experience and research, are likely to be effective.

With respect to information retrieval, it may be assumed that the performance situation is one in which the student, given some minimal cue, must recall (in order to use) specific information. Feedback about the adequacy of the student's recollections might come from various sources within the situation—other people, the student's own expectations, changes in the physical surroundings, for example. The instructional strategy most useful for establishing this behavior would seem to be that of giving the student practice in recalling facts under controlled cue and feedback conditions.

From previous performance analyses, the instructor already has a list of the information the student must retrieve. The instructor may now need answers to the following questions:

- In the work situation, what cues are generally available to aid in the retrieval of needed information?
- Are the cues unique to each kind of information? Can they be meaningfully grouped or categorized?
- Is the requirement for information retrieval generally sequential or random?
- Must prompts and other aids be withdrawn gradually? What evidence, if any, supports this?

Information needs for perceptual-motor skill objectives are similar. The instructor needs answers to questions like these:

- Under what conditions of prompting must each skill be performed?
- What kinds of feedback are normally provided in the work situation?
- What level of proficiency is desired for each skill?
- If equipment is involved, is it actual or simulated?

Finally, information needs for complex performance objectives might consist of answers to questions like the following:

- How many steps comprise each objective? Can they be easily separated?
- Should knowledge components be practiced separately from skill components? Or should they be practiced together?
- Is it feasible to provide students with a procedures outline as a memory aid?

Sources of Information. The best sources of information about these items would probably be persons currently performing in or managing the system of interest. However, if the instructor has previously gathered and analyzed information from such persons, there would be no need to repeat the effort. There is a good chance that the instructor may be able to obtain the desired information from existing analyses.

H. Implement appropriate learning management procedures.

1. Develop evaluation procedures to assess the student's progress through an instructional program.

Performance Situation. This task should be performed *after* all terminal and enabling objectives have been derived and sequenced, and *prior* to the presentation of any instruction. Basically, this step involves the development of criterion test items. These items must be based directly on terminal objectives, for their purpose is to assess the extent of student attainment of the stated objectives—that is, to determine whether students have acquired the necessary behaviors. Normally, at least two test items should be developed for each objective. In this way, if it is necessary to test a student on the objectives more than once, an alternate set of test items would be available.

Also, if test items are to serve useful diagnostic and prescriptive purposes, items must be developed for enabling objectives. This aspect will be discussed under the third task for this function.

Kinds of Information Needed. The terminal objectives are the most important kinds of information needs here. As one who should have played an active part in generating these objectives, the instructor should know whether they are adequate to permit the preparation of acceptable test items. If we assume performance test items as well as knowledge-recall items will be prepared, answers to these kinds of questions will be needed:

- What specific actions must the student perform? What specific knowledge must be recalled?
- On or with what equipment must the student perform? Will actual or simulated equipment be used?

- What important environmental and other conditions prevail when the individual performs the task?
- Which tasks are critical to acceptable job performance, that is, require errorless performance?
- What level of performance is required for each task that is judged not critical to adequate job performance?

Sources of Information. With respect to construction of tests, particularly performance tests, the best sources of information should be persons currently performing in or managing the system. But as mentioned in connection with previous tasks, if the instructor has already gathered information from such persons, the required data may already be available.

One aspect of this task deserves special mention. Evaluating student progress requires not only the development of appropriate test items, but also the determination of what constitutes acceptable performance on the items. This information is not hard to come by if the terminal objectives have been stated correctly and fully, for one part of each objective should tell how well (e.g., how accurately and rapidly) a specified activity should be performed. Thus, the objectives are the relevant sources of information about acceptable levels of performance.

2. Develop a record-keeping system to display student progress.

Performance Situation. Planning for this task should begin sometime before administration of the first performance test. The task is performed in anticipation of the need to maintain accurate and up-to-date records of student progress. Having decided to develop procedures to evaluate progress, it is necessary to develop a system for recording the evaluations. Since decisions about students will be made from these records, they must provide the kinds of information that will permit valid decisions.

Kinds of Information Needed. Ideally, the instructor needs a system (i.e., a record *form*) that will be easy to update and will indicate rapidly and accurately the progress of each student. Since each student must master each objective, one possible form is a simple matrix in which names of students appear along one axis and objectives along the other.

In the body of the form the instructor would place check marks (✓) or some other kind of notation, depending on what the instructor thought would be helpful. Also, the dates on which students attained given objectives might be recorded, as well as the number of times a student attempted an objective before achieving it, or the remedial instruction proposed for a student. The more the instructor would like to include, of course, the more space needed on the form.

What to include might depend on answers to the following questions:

- What is the prime requirement for maintaining student records? To direct students in their subsequent study? To place students in some category or classification? To assess program effectiveness?
- Does the training institution require grades or some way in which to place students in rank order?
- Who needs the information that will be recorded? How detailed must that information be? In what form must it be?

Sources of Information. If we assume that the main user of information about student progress is the instructor, then the instructor should be the main source of information

about student records—their content, form, amount of detail, and so on. If there are other users of the information, such as an instructional department, a school, or a related agency, their needs may be different. They would be additional sources of information about the content of a record-keeping form.

3. Detect and correct progression difficulties.

Performance Situation. This task should be performed when progression difficulties are evident—for example, when a large number of students fail a mastery test the first time they attempt it, or when a few students are repeatedly cycled through instruction and mastery tests without success.

If a trial instructional program is being pretested prior to its use in a classroom, progression difficulties can be attacked without disruption of ongoing instruction. If they are revealed during regular instruction, it is a little more serious because there may not be much time to diagnosis the shortcoming. In both situations, however, the activities of the instructor are the same.

Kinds of Information Needed. In trying to correct a progression difficulty the instructor would need answers to questions like these:

- Which specific objectives were not mastered?
- On the objectives that immediately preceded the failure(s), was performance only minimally acceptable, highly acceptable, or at some level in between?
- How do the students account for their failure? What specific things do they complain about? How do they feel the instruction could be improved?
- What skills make up the failed objective?
- What skill levels were achieved before mastery was attempted?
- What knowledges presumably were required to achieve the objective? Which ones are students now unable to produce?

Sources of Information. Much of the information needed by the instructor for this task comes from an analysis of the results of the mastery test. In addition, the instructor may diagnose deficiencies by checking on student capabilities to perform component skills or actions and to recall required items of knowledge.

Area II: Instructor Classroom Behaviors

A. Implement a classroom environment that minimizes the occurrence of aversive stimulation.

1. List possible aversive conditions that could exist in a classroom.

Performance Situation. In anticipation of implementing instructional practices that facilitate learning, the instructor should determine whether conditions exist that may interfere with learning. This task can be undertaken several times while conducting a course, but instructor and students will benefit most if it is accomplished before the course is begun. Any instructor who wants to eliminate aversive classroom conditions must first define these conditions.

Kinds of Information Needed. In developing his definition, the instructor needs answers to two questions:

- What conditions are typically labeled aversive?
- In what kinds of situations (events, circumstances, relationships, etc.) do aversive conditions tend to appear?

These two questions are directed at defining what aversive conditions are and where they are likely to be located. From the behavioristic point of view, the most influential factors on student learning and performance are conditions and events in the classroom. Thus, by definition, any classroom event or condition that interferes with learning is aversive.

Sources of Information. To list possible aversive conditions, the instructor can either observe the classrooms of fellow instructors, noting the effects of various events and conditions, or he can recollect from personal classroom experiences (both as a teacher and as a student) the events and conditions that tended to interfere with learning. In this connection, the instructor may ask present or former students for aid in developing the list.

In general, an aversive condition is a situation or event that a person tries to avoid. It arouses pain, distress, or discomfort. For example, persistent loud noises in a classroom could be aversive to students. Such a stimulus cannot be easily ignored, and the more the students must attend to it, the less they can attend to other stimuli—instructor comments, instructional materials, instructional procedures. Thus, loud noises tend to interfere with learning.

Aversive conditions may stem from instructor behavior, student behavior, or some situation within the school system. For example, a student may distract other students (interfere with their learning) by being noisy, moving unnecessarily, or repeatedly asking irrelevant questions.

Instructor-produced aversive conditions often stem from the use of punishment and negative reinforcement. An instructor may insist that students always respond in a specific sequence, for example. In a formal classroom situation he may demand that students adhere to a prescribed sequence of actions when they ask or answer questions (rise, identify himself, ask or answer a question, attend to instructor's response, return to seat, etc.). If a student skips a prescribed step (fails to rise, returns to seat prematurely), the instructor may criticize him publicly and ignore the fact that the "content" part of his performance was quite acceptable. Frequent use of these treatments by the instructor may elicit avoidance, escape, and aggressive behaviors by students. They may be late to class, not respond appropriately when called upon, try to drop courses, turn in work grudgingly, or otherwise try to express their discomfort.

Examples of aversive conditions stemming from within the instructional system might be such items as cumbersome class schedules, inadequate training facilities, and requirements to satisfy petty regulations.

2. *Given a list of aversive classroom conditions, identify those that actually exist in the classroom.*

Performance Situation. This is an extension of the previous task and should be undertaken soon after the start of a course. Having developed a list of possible aversive conditions, the instructor's goal is now to determine which ones exist in the class being taught.

Kinds of Information Needed. To perform this task the instructor needs to know which aversive conditions (if any) are present in his classroom. This means arranging for individuals to observe the classroom and report any specific aversive conditions.

Sources of Information. Two main sources of information would be the instructor's supervisor and students in the class. The instructor could request that the supervisor, during his regular observation of the class, make special note of specific conditions that he viewed as aversive. Students in the class could be invited to make similar observations, which might be reported anonymously. Finally, the instructor could also serve as a source of information, with the focal point the behavior of students, rather than the instructor's own behavior.

3. *Given a list of aversive conditions that actually exist in the classroom, prepare a set of classroom rules to minimize the conditions.*

Performance Situation. After identifying specific aversive conditions in his classroom, the instructor may attempt to eliminate or reduce certain of these conditions by the use of classroom rules. Since these rules are likely to be more effective if they are readily acceptable to students, the instructor should solicit student help in developing them.

Kinds of Information Needed. Consideration of the nature of the identified aversive conditions and their presumed source(s) will provide the basis for deciding which conditions might be improved through adoption of classroom rules. Classroom rules are directed at controlling student behaviors; they state what the student must do or must not do. Aversive conditions stemming from instructor behavior or from within the school system are not likely to be amenable to control through classroom rules. For example, if the aversive condition of poor classroom ventilation is due to a regulation that the classroom door must be kept closed during instruction, a classroom rule does not provide a means of correcting the situation. Similarly, if an aversive condition relates to the instructor's preference for using punishment rather than reward as a motivating technique, a classroom rule could not solve the problem. There is always the possibility, of course, that classroom rules could be developed to cover *instructor* behavior as well as student behavior.

These guidelines should enable the instructor to differentiate the aversive classroom conditions that might be minimized by the use of classroom rules.

Sources of Information. Primary sources of information are the students in the classroom and the instructor's supervisor.

B. Implement a reinforcing environment in the classroom.

1. *Given a schedule of a training program, prepare a list of student activities that facilitate learning.*

Performance Situation. Ideally, this task should be performed prior to instruction. If this has been impossible, it should be undertaken during the first instructional periods. Having identified and minimized conditions that interfere with learning, the instructor should try to identify student activities that enhance learning. This means defining situations that have facilitative effects.

Kinds of Information Needed. Following are three suggested situations that tend to facilitate learning:

(1) Orientation. When a course begins, it is important to acquaint the students with the objectives of the course and with the instructor's expectations for the class. Some considerations for an orientation include:

- What information is given the students about the instructional materials?
- How is information about the course presented?
- Are students given the terminal objectives? How?
- What evaluation techniques will be used?
- How do students know that course goals are within their reach?

(2) Active Participation. Passive presence in class is insufficient to ensure that learning will take place. The answers to the following questions will point out some student activities that strengthen learning.

- When do students try to participate in class?
- How enthusiastic are they in their responses?
- How many questions are asked that are relevant to the present situation?
- How often do students answer the instructor's questions correctly and in a way that shows they are listening?

(3) Lesson Completion. The completion of an assignment to be done either in the classroom or out will facilitate learning. Questions to answer here might be:

- How are the directions for doing the assignment given?
- How is the assignment within the reach of the students?
- Is there enough time to complete the assignment?
- How is the assignment relevant to the course and the present place of study?

Sources of Information. Again, the primary source of information is the instructor himself. If the task is undertaken before instruction begins, he may call on his past experience both as an instructor and as a student. He may also wish to discuss these situations with his supervisor or peers.

If instruction has already started, the instructor may wish to conduct student discussions of some of these things during the first days of instruction.

2. *Given a list of student behaviors that facilitate learning, implement the general contingency management (CM) procedures to elicit and maintain such behaviors.*

Performance Situation. The instructor should undertake this task after being satisfied that he has identified activities that will facilitate student learning in the classroom. The goal now is to employ practices that will elicit and maintain these learning behaviors.

The use of general CM procedures described here requires a considerable amount of observation of students and instructor. It is appropriate right at the start, then, to

acknowledge that an instructor probably cannot devise and employ effective CM techniques while working alone. In this and subsequent tasks in Area II, therefore, it is assumed that the instructor will seek to perform these tasks only when two or more instructor personnel can work together.

Kinds of Information Needed. The instructor needs information that will produce answers to questions like these:

- What are general CM procedures?
- When should they be used? In what circumstances or situations?
- How should they be used?

General CM procedures consist of providing positive reinforcement to a student who is engaged in appropriate classroom behavior (attending, studying, completing an assignment, etc.), and withdrawing reinforcement when the student is engaged in inappropriate behavior (*not* attending, not studying, not completing an assignment, etc.). In a typical Army classroom—as in *any* classroom—positive reinforcement often consists of the use of social reinforcement by the instructor. Common examples are approval, praise, recognition, and success in learning.

Some specific examples of praising words follow:

Good	Fine	I like that
That's right	Great	That shows a great deal of work
Excellent	Good job	Wonderful
That's clever	Good thinking	Absolutely correct

In adopting a behavior pattern calling for frequent positive reinforcement to students, the instructor must avoid inadvertently reinforcing some inappropriate behavior. For example, the instructor might reinforce a student's response to a question prematurely; if the response was only partially correct, the instructor should have reinforced it differentially.

Sources of Information. While references describing the use of general CM procedures in the management of children (e.g., Becker,[1] ; Buckley and Walker,[2]) are readily available, references from industry may be more pertinent. Brief discussions of the actual use of reinforcement in work situations may be found in two past issues of *Business Week*.[3] References dealing with CM techniques in the Army are Cassileth[4] and Whitmore.[5]

[1] Wesley D. Becker. *Parents Are Teachers: A Child Management Program*, Research Press, Champaign, Illinois, 1971.

[2] Nancy K. Buckley and Hill M. Walker. *Modifying Classroom Behavior: A Manual of Procedures for Classroom Teachers*, Research Press, Champaign, Illinois, 1970.

[3] "New Tool: 'Reinforcement' for Good Work," *Business Week*, December 18, 1971.

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[4] Barrie Cassileth. *Reinforcement Management: An Approach to Motivating Army Trainees*, HumRRO Technical Report 69-17, November 1969.

[5] Paul G. Whitmore. *Use of the Job Model Concept to Guide Job Description Procedures for Army Officers*, HumRRO Technical Report 73-26, November 1973.

C. Design and implement a monitoring system.

1. Given a classroom environment that reinforces appropriate learning behaviors, observe student behavior to identify inappropriate individual or group behaviors.

Performance Situation. This task is a continuous one that should be performed throughout the conduct of a course. Its purpose is to identify inappropriate student behaviors as early as possible so that corrective action can be taken without delay.

Kinds of Information Needed. Helpful information would include answers to these questions:

- Are certain students behaving in ways that interfere with their own learning? Or the learning of others?
- What are these behaviors? How often do they occur?
- How many students are involved?
- What kinds of observation forms would probably be most helpful?

Sources of Information. While the instructor may obtain most of the needed information through personal observations, there may be occasions when he should ask his supervisor for assistance. For example, if the instructor has identified a target student, a classroom observer may obtain or record systematic information about the student's behavior more easily than the instructor.

2. Given the need for a CM program, develop techniques for formal observations of students.

Performance Situation. This task is performed when the instructor has identified a problem behavior in a student that does not seem to be correctable by general CM procedures. There has been sufficient preliminary observation to substantiate the presence of a problem, and it is now necessary to initiate more specific CM techniques. To do this, the instructor must first devise procedures for obtaining valid and reliable observations of the student.

Kinds of Information Needed. The basic items of information needed here are answers to these questions:

- What behavior is to be observed and recorded?
- In what ways can the behavior be most effectively observed and recorded?

If the behavior of several students in a class is of interest, or if there is some doubt about the circumstances that immediately precede or follow a given behavior, a videotape record of the class will provide reliable data. The tape can be viewed repeatedly, if necessary, and the results summarized on a record form.

If such complications are not present, "live" observation of a student's behavior may be better, keeping a record on a simple printed observation form. The instructor, an assistant, or the instructor's supervisor might observe the student. In general, only two behavioral dimensions are of interest: frequency and/or duration of a given behavior.

In addition to providing for the usual identifying information (instructor, student, course name and number, class period, date, etc.), the observation form should permit

the observer to make a tally mark each time a designated behavior occurs or to record the duration of a given event each time it occurs. Additional space should be available for the observer to make other comments if desired. The form can be used with videotape records as well as in live classrooms.

A sample form for recording observations of a student's behavior is given in Appendix D.

Sources of Information. The instructional department may be the main source of information in this case. If the department has videotaping facilities and has established a pattern of using them to record student behavior, such facilities are likely to be available for this task. Other instructors or supervisors are additional sources of information. Some of them may have developed observation forms in the past or served as observers for fellow instructors.

3. *Given an observation schedule and a set of record forms, observe and record the occurrence of an inappropriate behavior.*

Performance Situation. This task should be performed after the target student has been identified and suitable record forms have been prepared. Because of many classroom demands, the instructor may not undertake this task personally, but may request an assistant or the supervisor to perform it.

Kinds of Information Needed. The need for an objective description of the behavior to be observed is pre-eminent. Only when the behavior is stated in unambiguous and forthright terms can two or more observers agree on its frequency and/or duration. A good description is analogous to the "action" portion of a performance objective. It states explicitly what the student does.

Here are some descriptions of student behavior for which an instructor might wish to have systematic observations:

(1) Student repeatedly asks irrelevant questions during a question and answer period.
(2) When called on by the instructor, student generally cannot offer an acceptable answer.
(3) Student never volunteers answers to questions posed by the instructor or another student.
(4) Student frequently engages instructor in discussions on topics that are completely tangential to the focus of the course.
(5) Student turns in incomplete homework assignments.
(6) Student lays head on desk and appears to be sleeping during a good portion of class time.
(7) Student doesn't pay attention to instructor (eyes closed, head on desk, looking out window). He must have questions repeated before attempting an answer.
(8) Student consistently wants more clarification of subject—holds class too long on one area or aspect.
(9) Student attracts all attention to himself, always answering and contributing. Has good answers, questions, discussions, but must be star attraction.
(10) Student comes to class unprepared—must always borrow pencil, pen, paper, books, etc.
(11) Student is frequently late for class.
(12) Student consistently complains about anything and everything.
(13) Student reads magazines or other material in back of classroom.

It should be obvious that some descriptions are more objective than others. Less objective descriptions may require clarification before reliable observations can be made.

Sources of Information. A good source of information about the adequacy of a behavior description would be another instructor, a supervisor, or a class assistant. If they readily accept the description or otherwise indicate their capability to observe and record the behavior, there is a good chance that the description is satisfactorily objective.

4. Given that an inappropriate behavior presents a problem, identify the aspect of the environment that is maintaining it.

Performance Situation. This task should be undertaken when the evidence clearly indicates the presence of a problem. It represents the final step prior to determining whether one should initiate a formal CM program.

Kinds of Information Needed. Behavior persists or decays primarily as a function of the consequences of the behavior. This means that the events that occur after a response (behavior) is made determine the likelihood that the response will be made in the future. Responses that are followed by satisfying or rewarding events are more likely to recur than responses that are followed by unsatisfying or non-rewarding events.

From this conception, then, the instructor needs answers to the following questions:

- What classroom events follow the student's behavior?
- What did the instructor do?
- What did the other students do?

To get this information, the instructor (or class observer) must observe not only the instances of the student behavior but also the events that immediately follow it. These events should also be recorded on the observation form.

Here are possible events that might occur following some of the inappropriate student behaviors listed in the previous task.

Behavior	Event
Student asks irrelevant questions.	Instructor answers each question patiently and in some detail.
When instructor asks a question, student never volunteers an answer.	Instructor always calls on volunteers to answer, grumbling that other students should participate more.
Student engages instructor in discussions tangential to the focus of the course.	Instructor spends much time interacting with student.
Student turns in incomplete homework assignments.	Instructor says "Okay," and turns immediately to other class business.
Student lays head on desk as though sleeping.	Instructor makes unflattering remark about student; other students laugh.

Sources of Information. An ideal source of information would be a videotape. However, if tapes of the class have not been prepared, the form prepared by the observer may be employed. Either the instructor or the class observer should be able to produce the desired information.

An instructor might first make some informal attempts to modify a student's behavior. In general, these efforts would require much less time and effort than would a formal CM program. Here are some examples of possible approaches:

(1) The instructor might simply talk to a target student, explaining the behavior that needs to be changed, and requesting that the student make the change. In some cases, this may be all that is needed.

(2) Suppose a student continuously asks irrelevant questions. If a request to stop has not been successful, the instructor may inform the student that these kinds of questions will no longer be answered. The instructor will simply ignore the student and call immediately upon another student.

(3) A way of increasing response by certain students would be to use separate cards containing each student's name. Students who do not respond often will have their names on three or four cards, while the names of other students will be on only one. Before asking questions, the instructor will riffle the cards so that the students cannot predict when they will be called upon to respond. This system has the advantage of equalizing the amount of interaction between the instructor and each student.

(4) If a student presents an entirely different problem—for example, taking too much time on each occasion to offer a response—the instructor may inform the student that only so much time will be allowed for each response. To start, the limit might be 60 seconds. Using a stop watch, the instructor will provide the student with a countdown of the time remaining during each response. When the student completes a response within the time limit, the instructor will provide public reinforcement. If the student exceeds the limit, the instructor may impose the condition that the student cannot respond for 10 minutes.

If several attempts have been unsuccessful, the instructor should seriously consider implementing a formal CM program.

D. Develop and implement a formal CM program.

1. Given a behavior to eliminate, a behavior to strengthen, and the environmental element that maintains an inappropriate behavior, prepare a strategy for modifying the behavior.

Performance Situation. This task should be performed in anticipation of actually implementing a formal CM program for a student. The goal of the task is to optimize the chances of developing an effective program.

Kinds of Information Needed. To develop an effective CM program, the instructor must systematically consider several important matters. Expressed in actions to be undertaken by the instructor, the behaviors are:

(1) Deciding on main characteristics of the program.
(2) Arranging an observation schedule.
(3) Obtaining a baseline record.
(4) Developing a list of reinforcers.
(5) Preparing instructions for the target student.
(6) Preparing instructions for the class.
(7) Scheduling availability of reinforcements.

Sources of Information. Most of the literature on the development and use of CM programs relates to elementary level instruction.[1] However, some items describing industrial and military aspects of such programs are available.[2]

2. Given the complete statement of a formal CM program, implement the program in the classroom.

Performance Situation. This task is an extension of the previous one; it is undertaken when all work on the planning and preparation of a formal CM program is complete. The behavior to be modified has been carefully identified and described, recording forms have been prepared, baseline performance has been accumulated, students have been instructed as to what they are to do, and specific procedures for administering reinforcers have been settled upon. The only remaining task is to implement the program.

Kinds of Information Needed. Information needs were considered in the previous task.

Sources of Information. Again, the suggested sources of information for accomplishment of this task were considered in the previous task.

Area III: Professional Growth

A. Identify areas for personal improvement.

1. Facilitate discussions related to professional growth.

Performance Situation. Staff meetings, informal staff gatherings, and other occasions when instructors congregate present opportunities for discussions of professional growth. Thus, this task is performed almost continuously, although the extent of the activity may vary widely from time to time.

Kinds of Information Needed. Although the importance of an instructor is universally recognized, few specific characteristics of a competent instructor have been agreed upon. Teaching effectiveness is measured in the favorable development of basic skills, understanding, work habits, and adequate personal adjustment of students. Of course, this is all general and abstract and not easily translated into specific instructor behavior. Answers to the following kinds of questions are needed to facilitate discussions related to professional growth:

- What is professional growth?
- Where do instructors find information about professional growth?
- What does professional growth have to do with effective teaching?
- How can instructors tell if they are effective?
- What are the measurements for effective instruction?
- What are some warning signs (feedback from students) of ineffective instruction?

[1] E.g., Becker, *op. cit.*; Buckley and Walker, *op. cit.*

[2] E.g., *Business Week*, *op. cit.*, 1971; *Business Week*, *op. cit.*, 1972; Cassileth, *op. cit.*; Whitmore, *op. cit.*

- What can be done to remedy this?
- Where do instructors go for help if they feel their teaching is ineffective?

Sources of Information. Two sources of information would be the instructor's supervisor and other instructors in the department. Professional journals, magazines, and/or other publications can provide suggestions for actions to be taken to improve professional capabilities. Conferences, symposia, and workshops are other sources, if the instructor can attend.

2. *Determine areas where personal teaching performance is weak and where personal improvement might be desirable.*

Performance Situation. In order to determine areas in which his instruction is weak, an instructor with supervisor guidance might develop evaluation techniques and/or rating forms. The instructor would need to identify the sources of information that best help identify the areas where personal improvements would be beneficial.

Kinds of Information Needed. Self-evaluation is only one way to determine weak areas in instruction. Student achievement, student opinion, and the opinions of other instructors are also valuable sources of feedback. Since some of the same questions might be used for more than one source, this overlap can be useful in making the evaluation. By making comparisons, the instructor, with supervisor guidance, will be able to ferret out instructional weaknesses. Some of the kinds of information needed from these sources are:

Self-evaluation.

- How have the major objectives of the course been stated?
- How much agreement is there between course objectives and class assignments?
- How are class presentations planned and organized?
- How effectively is class time used?
- How are students encouraged to participate in class?
- How enthusiastic are the students' responses?
- When do students seem to be paying the most attention?

These questions might also be used by an observer in the classroom and by students as part of a questionnaire.

Student Achievement

- How often are assignments completed?
- How well do students do on progress tests?
- Do students complete the projects assigned to them?

Student Opinion

- From personal conversations with students, what are the students' opinions of the course and the instructor?
- Would a questionnaire help in obtaining more accurate student opinions?

Opinions of Other Instructors

- From their observations of a class, how do other instructors rate this instructor's performance?
- What are their comments or suggestions?

Sources of Information. As cited above, the four valuable sources of information are self-evaluation, student achievement, student opinion, and the opinions of a supervisor or other instructors. One other valuable source would be a videotape of one or more of the instructor's classes. Weak and strong parts of the instruction can be pointed out, and the instructor has a chance to see himself as his students see him. (See Appendix E on Videotaping.)

B. Determine possible courses of action to bring about improvement in professional capabilities.

1. Routinely read professional journals and/or magazines to acquire information and suggested actions for improving professional capabilities.

Performance Situation. Regular reading or scanning of professional publications is an aid in determining some ways of achieving professional improvement. These publications often have articles with suggestions for professional growth that can be implemented by the instructor. The instructor should be prepared to report to fellow instructors the actions described or recommended in the publications.

Kinds of Information Needed. In this situation, an instructor would need to find out the kinds of publications the local military library carries. After locating a relevant professional publication, the instructor should read the table of contents and scan articles for possible use.

Sources of Information. Some of the professional publications typically carried by military libraries are:

Adult Education
American Educational Research Journal
American Vocational Journal
Audiovisual Instruction
AV Guide
Educational Broadcasting
Educational Technology
Engineering
The Journal of Educational Research
Industrial Education
NSPI Journal
Phi Delta Kappan
School Shop-Industrial Education
Technology Review
Theory Into Practice (TIP)
Training in Business & Industry
Training and Development Journal

2. When feasible, attend conferences, symposia, and workshops that are focused on professional problems.

Performance Situation. Many times during the year, conferences, symposia, and workshops are offered by various kinds of profit and nonprofit professional organizations. If cost and location are reasonable and the teaching loads not too heavy, the instructor

might try to attend one or more of these. Any problems or recommendations that emanate from such conferences should be reported to fellow instructors.

Kinds of Information Needed. The first kind of information needed is the type of conference being offered. From the announcements, an instructor can assess what is being presented and decide whether the workshop will stimulate professional growth. The time of the workshop will be another deciding factor, for the teaching time lost, if any, must be considered; also, the distance to be traveled can raise the transportation cost beyond a reasonable level. Other cost considerations include accommodations, meals, and attendance fees.

Sources of Information. Professional publications, such as those listed in III. B. 1., carry articles advertising workshops, conferences, and so on. Bulletins and other announcements are often sent to schools by profit and nonprofit organizations. These may be passed around or posted. Also, various sections of the military organization offer conferences, announcements of which are distributed to all interested parties.

C. Encourage personal improvement efforts by other instructors

1. Consistently reinforce the efforts of other instructors to improve their teaching.

Performance Situation. Whenever instructors discuss professional growth, their efforts should be encouraged. Like everyone else, instructors need consistent reinforcement of their efforts and reinforcement by peers is a valuable instrument. Accordingly, instructors should encourage their fellow instructors to improve their instructional behaviors. A good listener who offers solution-oriented comments can be just the encouragement another needs to attempt improvements.

Kinds of Information Needed. A knowledge of recent articles in publications on professional improvement makes it easier to talk about instructional behavior. Such conversations may help to encourage other instructors. For example, an instructor who is advised of relevant articles might be encouraged to begin a program of personal improvement. Also, a knowledge of conferences, symposia, and workshops—past, present, and future—can be beneficial. Specifically, details about current or future conferences, as well as information gained from past conferences, should be extended to fellow instructors for their guidance.

Sources of Information. Sources of information about publications and conferences are stated in III. B. 1. and 2. In addition, an honest concern for what another is saying is one of the best sources of reinforcement; the value of a good listener is limitless. Also, public acknowledgment of the merit of other instructors' suggestions provides the kind of support that encourages them to begin improvement efforts.

2. Reinforce efforts by fellow instructors to produce quality instructional materials and to employ effective practices in teaching.

Performance Situation. When requested to review a lesson plan, test, or special teaching materials that another instructor has developed, the instructor should make encouraging comments and try to offer positive suggestions. Any effort to produce quality instructional materials or to employ effective teaching practices should be reinforced.

When appropriate, the instructor should publicly acknowledge the merit of another's products and practices. This should be done in the presence of other instructors, the fellow instructor, and supervisors.

Kinds of Information Needed. The information an instructor needs here are answers to the following kinds of questions:

- What are the other instructors doing?
- What are their special teaching areas?
- What have they done in the past?

The instructor should keep up to date on the activities of other instructors in the department.

Sources of Information. Informal and formal staff meetings are good sources of information. Similarly, private conversations can bring an instructor up to date on a peer's activities. Instructors who show an interest in all the activities around them will be in a position to positively reinforce those efforts of improvement. These meetings also present excellent opportunities to publicly acknowledge the merits of others.

Area IV: Innovative Practices

A. Identify and select feasible innovative practices.

1. Attend conferences, and the like, that are devoted to discussion and/or evaluation of innovative training practices.

Performance Situation. Instructors should always be looking for innovations to improve their training practices. Many conferences and workshops are devoted to the discussion and/or evaluation of innovative training practices. As indicated in III. B. 2., the instructor should try to attend one or more of these. The instructor should also be prepared to recommend, and to defend the institution of, such practices in the department.

Kinds of Information Needed. The kinds of information needed here are similar to those in III. B. 2. The instructor should read all available materials about conferences, symposia, and workshops, prior to deciding which could be valuable both personally and to the school. If it is feasible in terms of teaching load, location, and cost, the instructor should attend those that might be of value.

Sources of Information: The sources of information here are the same as those cited in III. B. 2.

2. Routinely read reports, articles, and books that describe and recommend innovative training practices.

Performance Situation. To find information on innovative training practices, the instructor must routinely read reports, articles, and books. Reading should be followed by reports to fellow instructors on the status of such practices. Also, the instructor should be able to defend any recommendation for new practices to be instituted in his department.

Kinds of Information Needed. The instructor needs information about the kinds and names of publications in the local military library. After locating a likely publication, the instructor should read the table of contents and scan articles for possible use.

Sources of Information. Some names of professional publications typically carried by military libraries are listed in III. B. 1.

B. Arrange for test and evaluation of selected innovative practices.

1. Select a new educational practice for trial use in a classroom.

Performance Situation. This task is dependent on prior completion of the two previous tasks. After reading several publications and possibly attending a conference, the instructor should be ready to select an innovative practice for trial use in the classroom.

Kinds of Information Needed. Some of the things to consider when selecting an innovative practice for one's own classroom are:

- Has this practice been proven effective, or is it just conjecture?
- What is the evidence?
- Where has this practice been tried? In what kind of school?
- Has it been tried with adults, children, industry, or military?
- Can this practice be applied and adjusted to the instructor's classroom?
- Is it a feasible plan for the military?
- Just what is innovative about it?
- Will the school administration approve this practice?

Sources of Information. There will be several sources of information in this case. One will be any articles the instructor has read. A second source would be materials presented at conferences or workshops attended by the instructor. The instructor should try to find other views about the practice in order to verify or to nullify the selection. There should be talks with peers prior to seeking the supervisor's support.

2. Seek the supervisor's support and approval for trial use of a given innovative practice.

Performance Situation. After selecting an innovative practice to implement in the classroom, the instructor must obtain the support and approval of the supervisor and other administrative officials. To enlist this support, the instructor should carefully document all possible evidence in favor of the new training practice. The instructor should also prepare solid arguments to defend the practice if called upon.

Kinds of Information Needed. In documenting the selection of a practice, an instructor should have more than one source to call upon, including a conference, several articles, and at least one other source. The director should also be able to answer questions like these:

- Why should the practice be implemented in the school?
- How effective can it be?

- How does the instructor plan to implement it?
- What proof does the instructor have that there is a need for implementing this practice?
- How long does the instructor plan to test it?
- How soon can results of this implementation be reported?

Sources of Information. Most of the documentation should have been done in task B. 1., *selecting an innovative practice.* At this point, if the instructor is sure about the selected practice and can prove it, convincing the supervisor or other administration officials should not be a problem.

3. After receiving approval and support for trying a new training practice, use controls to provide for valid evaluation.

Performance Situation. After receiving approval to try a new training practice, the instructor should provide controls for a valid evaluation. This will facilitate presentation of the results of the training practice to the supervisor and other instructors.

Kinds of Information Needed. To validate an innovative practice, the instructor needs answers to the following questions:

- What are the goals of this training practice?
- What criteria tests has the instructor prepared for evaluation?
- How many students reached this goal?

Sources of Information. In this situation the best sources of information are the instructor and the instructor's criteria.

SUMMATION

Based on a previously developed model of desired instructor behaviors, this report describes a set of activities and experiences an instructor could undertake to acquire those behaviors. Some, but probably not all, of the activities already exist in ongoing instructor training programs. For that reason, recommended activities and experiences are elaborated in each of the instructor tasks to facilitate their use for and by the instructor. Special appendices are included to provide more guidance in certain tasks.

In using this report, it is anticipated that Army schools and related training agencies will focus primarily on those instructor tasks where increased competence is most needed. Also, it is assumed that the recommended activities can be incorporated into ongoing programs with minimal disruption.

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APPENDICES

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Appendix A

A MODEL OF THE FUNCTIONS OF A MASTER INSTRUCTOR

(Excerpted from HumRRO Technical Report 73-23)

The model lists four Areas of Performance with several functions and tasks cited for each area, as follows:

I. Training Programs. Development and implementation of training programs that maximize student acquisition of required knowledge and skills.

II. Instructor Classroom Behaviors. Design and implementation of practices that facilitate learning and weaken those student behaviors that interfere with learning.

III. Professional Growth. Planning and implementation of a program of professional growth for self and other instructors.

IV. Innovative Practices. Examination and planning for a test of innovative practices in the classroom.

For convenience, the areas of performance were divided into specific functions before statements of tasks were prepared. As might be expected, the amount of detail available to describe functions and tasks varied. While no consistent comparability is implied across alphanumeric designations, those performance statements headed by Arabic numerals describe, in general, the level of behavior of greatest interest.

It should not be implied that the functions and tasks listed under the first area of performance must be performed by the master instructor working in isolation, that is, independently. On the contrary, it is probably desirable that not all instructors perform all functions but rather that they pool their skills and divide the work. In addition, of course, it is likely that some of these functions (specially "Determine existence of instructional need," and "Evaluate capabilities of entering students,") will sometimes be performed by higher authority and are not within the routine scope of the master instructor. Thus, there is no expectation that the master instructor will always perform these functions.

Area I: Training Programs—*Development and implementation of training programs that maximize student acquisition of required knowledge and skills.*

A. Determine the existence of an instructional need.

1. Given empirical or anecdotal evidence of a performance discrepancy in an existing system, analyze the discrepancy from the point of view of the usefulness of or need for formal instruction. As a minimum, the instructor should be able to define the extent of the discrepancy, recommend possible ways to overcome it, and plan appropriate action to prevent its recurrence.

2. Given the existence of a new system, new equipment for a system, new command responsibilities, or some comparable event, determine the probability that a need for formal instruction exists. The instructor should make a preliminary analysis of skills likely to be needed in the new situation and compare them with existing skills.

B. Perform a system analysis.

1. Given an existing system with a designated performance discrepancy and a command decision to generate instruction to remove the discrepancy, analyze the system, placing primary emphasis upon the delineation of functions that require human performance.

2. Given a newly generated system in which individuals must be trained to perform, analyze the system. The analysis should identify important system components, functions, environments, and constraints.

C. Determine performancy requirements.

1. Given the results of a system analysis, including the preliminary enumeration of functions to be performed by man, develop a set of tentative performance requirements. The requirements should state the knowledge and skills demanded of man if he is to perform effectively in the system.

2. Given a set of tentative performance requirements and access to appropriate system literature, doctrine, personnel, and other relevant sources of system information, substantiate the performance requirements.

D. Evaluate capabilities of entering students.

1. Based upon information about anticipated performance requirements, devise test items that will assess the present capabilities of students who are to enter the intended training. The test may include aptitude, knowledge, and skill items. Items may be taken directly from a previously prepared final performance examination if such is available and appropriate.

2. Administer the assessment test to students who are scheduled to enter the training program.

3. Evaluate the results of the assessment test in light of the anticipated performance requirements.

E. Specify instructional objectives in behavioral terms.

1. Using the statements of performance requirements as guides, and taking into account the existing capabilities of entering students, prepare a list of *terminal* instructional objectives. These objectives should constitute the performance goals of a course of instruction that will enable students to meet the desired performance requirements. Each objective should contain, as a minimum, a statement of the specific student action, an indication of important performance conditions, and a description of the level of acceptable student performance.

2. For each terminal instructional objective, prepare a set of enabling objectives to make possible the achievement of the terminal objectives. Enabling objectives should be written to the level of the minimally prepared student. To ensure this, the instructor should perform the following steps:

a. Prepare a draft set of directions for performing the behavioral acts specified by each enabling objective at a level of detail and language believed to be appropriate for minimally prepared students. Initial effort should be placed on those objectives that have been most difficult to attain.

b. Test the accuracy of the draft set of directions by submitting them to other instructors for review.

c. Test each set of directions with one minimally prepared student at a time. Revision of directions should continue until they are effective in eliciting proper performance from such students.

d. Formulate significant directions for each set of enabling objectives, paying particular attention to organized information to be stored in memory and perceptual-motor skills not possessed by minimally prepared students.

F. Arrange both terminal and enabling instructional objectives into appropriate groups and orders.

1. Arrange the terminal objectives into primary groups in terms of common enabling objectives, that is, in terms of common information pools, common perceptual-motor skills, and similar sets of directions. This may be done most readily by arranging terminal objectives along one edge of a matrix, enabling objectives along the other edge, placing "Xs" in the appropriate squares. Primary groups of terminal objectives are those that share few, if any, enabling objectives with other groups. Further analysis of primary groups can be performed by instructors working together.

2. Arrange the terminal objectives in each primary group in order of learning difficulty.

a. Make estimates about the learning difficulty of each enabling objective in the primary group—"easy," "moderate," and "difficult" should be sufficient.

b. Select as the first terminal objective to be obtained the one that subsumes the fewest, easiest, and most common enabling objectives and proceed in this manner until all enabling objectives have been placed in an order. It is not necessary to place each one into a precise point, but only into order categories.

G. Implement effective learning activities for each objective in each primary group.

1. Identify each objective as being principally concerned with one of the following learning functions:

a. Information retrieval.

b. Perceptual-motor skill.

c. Complex performance.

2. Develop an instructional strategy for each objective.

a. Strategies for information retrieval objectives should allow the student practice in randomly presented information retrieval events with immediate feedback. Flashcards are an example. The student may also be provided with memory aids to prompt retrieval in some or all events. Preferably, memory aids should be on a demand schedule, presented only at the student's request. This may require that students work in coach-pupil pairs in lieu of using special machines or devices.

b. Strategies for perceptual-motor skill objectives will vary depending upon the particular kind of skill involved. Regardless of the details of any particular strategy, all of them should provide each student with many opportunities in which to practice the skill under conditions of prompting on demand and immediate feedback. Again, it may be most economical and effective to arrange students in coach-pupil pairs working with specially designed materials.

c. Strategies for complex performance objectives should provide the student with prompting on demand for each step or group of steps in the procedure. Directions for all except very short procedures should include a multi-level outline as a memory aid. In many instances, early learning can be concerned solely with acquisition of the verbal directions without actual practice of the performance. In this manner, the student can provide his own directions during later learning.

H. Implement appropriate learning management procedures.

1. Develop evaluation procedures that will assess and evaluate the student's progress through the instructional program. As a minimum, the instructor should prepare a number of test items for each objective, assembling the items into at least two alternate test forms for groups of objectives.

2. Develop a record-keeping system that will display the progress of each student. The system should indicate which objectives have been attained by mastery progression tests and which have not.

3. Detect and correct progression difficulties in instructional materials. Progression difficulties are indicated when a large number of students fail a progression mastery test on the first time through the instructional materials for that test, or when some students, who fail on the first try, recycle again and again without significant improvement.

Area II: Instructor Classroom Behaviors—*Design and implementation of practices that facilitate learning and weaken those student behaviors that interfere with learning.*

A. Implement a classroom environment that minimizes the occurrence of aversive stimulation.

1. Given a classroom situation typical of the instructor's experience, the instructor should list the possible aversive conditions that could exist in the classroom. Aversive conditions may result from instructor behavior, student behavior, or some situation within the school system. The instructor may ask the students to prepare a list of conditions that they think are aversive.

2. Given a list of aversive conditions, the instructor should identify those that actually exist in his classroom. The instructor may seek the assistance of his supervisor, the students, other instructors, and so forth in identifying the conditions.

3. Given a list of aversive conditions that actually exist in his classroom, the instructor should, with the aid of students, prepare a set of classroom rules that will aid in minimizing them. The instructor may also seek the assistance of his supervisor in preparing classroom rules. The instructor should plan his instruction around aversive conditions that cannot be eliminated.

B. Implement a reinforcing environment in the classroom that will strengthen (or elicit) appropriate student learning behaviors.

1. Given a schedule of a training program, the instructor should prepare a list of student activities, defined in behavioral terms, that facilitate learning. Suggested general categories of behavior that facilitate learning are:

a. Orientation, which involves getting students in contact with instructional materials and keeping them in contact for sufficient periods of time. The term instructional materials includes verbal as well as printed materials.

b. Attendance, which refers to students' presence in the classroom or attendance at special school activities.

c. Lesson completion, which refers to the completion of assigned work, either in the classroom or away from the classroom.

2. Given the list of student behaviors that facilitate learning, the instructor should implement the general contingency management (CM) procedures to elicit and maintain such behaviors. In using the general CM procedures, the instructor should use social reinforcement (approval, praise, success in learning) and should ignore inappropriate behaviors. When reinforcing students, the instructor should minimize inadvertent reinforcement of inappropriate behavior.

C. Design and implement a monitoring system to be used in identifying students who do not respond to the general CM procedures with appropriate learning behaviors.

1. Given a classroom environment that reinforces appropriate learning behaviors, the instructor should maintain a general observation of student behavior for the purpose of identifying inappropriate individual or group behaviors.

2. Given an indication of the need of a formal CM program, the instructor should develop techniques for formal observation of individual or group behaviors. A

behavioral statement of the inappropriate behavior should be prepared by the instructor. An observation schedule should be prepared providing for specific periods of observing and recording the occurrence of the inappropriate behaviors. Record forms must be modified or developed for recording data during the observation periods.

3. Given the schedule for observing a specific inappropriate behavior and a set of record forms, the instructor (or class assistant) should observe and record the occurrence of the inappropriate behavior for five to ten days. At the end of the observation schedule, the instructor will summarize the recorded data and determine if the inappropriate behavior occurs often enough to present a real problem—interfering with the learning process.

4. Given data to indicate that a specific inappropriate behavior presents a problem, the instructor should seek to identify the aspect of the environment that is maintaining the inappropriate behavior. This task will result in the decision that there is or is not a need for a formal CM program for changing the behavior.

D. Develop and implement a formal CM program for strengthening appropriate learning behaviors and extinguishing inappropriate learning behaviors.

1. Given a behavioral statement of an inappropriate behavior to be eliminated, an appropriate behavior to be elicited and strengthened, and the environmental element that is maintaining the inappropriate behavior, the instructor should prepare a statement of a strategy to be used for modifying the behavior. The complete statement of the strategy will include:

a. A list of reinforcers developed in consultation with the student and with his classmates.

b. A set of instructions to be given to the student and class as an explanation of the CM program.

c. Examples of the forms to be used in recording the observation data, along with graphs to be used in analyzing the progress of the program.

d. A schedule for observing behavior and administrating reinforcers.

2. Given the complete statement of a CM program for modifying a specific classroom behavior, the instructor should implement the program in the classroom.

Area III: Professional Growth—*Planning and implementation of a program of professional growth for self and other instructors.*[1]

A. Identify areas for personal improvement.

1. At staff meetings, informal staff gatherings, and on other occasions when instructors might congregate, the instructor should facilitate discussions related to

[1] In the final two areas, to clarify the meaning of certain action verbs or other concepts, the following definitions or alternative terms are provided:

Professional growth—development, advancement, improvement, betterment; an increase in capability as an instructor
Innovative educational practice—novel, new, promising educational practice
Facilitate—assist, aid, help, promote
Review—examine, study, comment upon
Determine—judge, decide
Read—study, review
Attend—be present at
Select—choose, pick out
Seek—solicit, request, ask for
Try out—test, make a trial use of
Reinforce—strengthen, "reward," acknowledge the worth of

professional growth. For example, he should be prepared to recommend possible activities, as well as to react constructively to ideas about professional growth as proposed by others. The instructor should not make unfair or unwarranted criticisms of the suggestions of other instructors, but should seek to privide positive, solution-oriented comments. Also, the instructor should encourage and reinforce attempts by others to provide comments.

2. From discussions with his supervisor, and with his assistance, the instructor should determine areas where his teaching performance is weak and where personal improvement might be desirable.

B. Determine possible courses of action to bring about improvement in professional capabilities.

1. Given access to selected professional journals and/or magazines, the instructor should routinely read (or scan) such publications for the purpose of acquiring information and suggested actions one might take with respect to improving professional capabilities. The instructor should be prepared to report to fellow instructors concerning actions described or recommended in the publications.

2. When feasible in terms of teaching load, and cost, the instructor should attend conferences, symposia, and workshops that are focused on professional problems of interest to instructors. The instructor should be prepared to report to fellow instructors any problems and recommendations that might emanate from such conferences.

C. Encourage personal improvement efforts by other instructors.

1. In all types of situations where instructors may engage in discussions focused on professional growth, the instructor should consistently reinforce the efforts of other instructors to suggest positive ways to improve their teaching. As convenient and appropriate, the instructor should publicly acknowledge the merit of suggestions of other instructors, or otherwise show support.

2. When requested by a fellow instructor to review his products (lesson plans, objectives, test items, etc.), the instructor should reinforce efforts to produce quality instructional materials and to employ effective practices in teaching. As convenient and appropriate, the instructor should publicly acknowledge the merit of others' products and practices in the presence of other instructors, the fellow instructor, supervisors, department heads, and so forth.

Area IV: Innovative Practices—*Examination and planning for a test of innovative practices in the classroom.*

A. Identify and select feasible innovative training practices.

1. When feasible in terms of teaching load, location, and cost, the instructor should attend conferences, symposia, and workshops that are devoted to discussion and/or evaluation of innovative training practices. The instructor should be prepared to report to fellow instructors regarding the status of such practices and to defend any recommendation he might make that such practices be instituted in his department.

2. The instructor should routinely read (or scan) reports, articles, and books that describe and recommend innovative training practices. The instructor should be prepared to report to fellow instructors regarding his understanding of the status of such practices, and should be able to defend any recommendation he might make that such practices should be instituted in his department.

B. Arrange for test and evaluation of selected innovative practices.

1. After attending conferences or after reading literature recommending given innovative practices, the instructor should be able to select a new educational practice for trial implementation in his classroom. The instructor should be prepared to defend his selection of an innovative practice to implement.

2. After having selected a given innovative practice to implement in his classroom, the instructor should seek support and approval of his supervisor and other administrative officials for its trial use. To improve his chances of obtaining approval, the instructor should carefully document the evidence in favor of the new training practice and be prepared to defend his selection.

3. After receiving approval and support, the instructor should be able to try out a new training practice. The instructor should use controls as appropriate to provide for a valid evaluation of its effects.

Appendix B

SAMPLE SYSTEM ANALYSIS

The following is a Partial System Analysis of a Mechanized Infantry Rifle Platoon. The analysis was taken directly from Smith.[1]

I. MISSION

A. General

The Mechanized Infantry Rifle Platoon will close with the enemy by means of fire and maneuver in order to destroy or capture him or to repel his assault by fire, close-combat, or counterattack.

B. Specific

1. Offense. During the attack the platoon mission is to close with and destroy or capture the enemy. This is done as part of a coordinated attack by a larger force or by the platoon deployed as a semi-independent force. The platoon will employ the offensive techniques appropriate as required by the following missions:

a. Daylight attack
b. Night attack
c. Attack of built-up area
d. Attack of fortified area
e. River crossing
f. Raids
g. Infiltration
h. Antiguerrilla operations
i. Reserve platoon in the attack
j. Airmobile operations

2. Defense. During defensive operations the mission of the platoon is to repel the enemy assault by fire, close-combat, or counterattack. The platoon will employ appropriate defensive techniques as required by the following missions:

a. Forward platoon in defense
b. Reserve platoon of forward company
c. Platoon on combat outpost line
d. Special defensive operations
   (1) Reverse slope defense
   (2) Perimeter defense
   (3) Riverline defense
   (4) Roadblock defense
   (5) Relief in place
e. Mobile defense
   (1) Security force
   (2) Fixing force
   (3) Striking force

[1] Smith, *op. cit.*

3. Retrograde movements. The mechanized rifle platoon participates in retrograde movements in accordance with coordinated plans when acting as part of a larger force. When operating as a semi-independent force, retrograde movements will be made as dictated by the situation at the discretion of the platoon leader. The platoon will employ retrograde movement techniques as required by the following missions:

a. Retirement
b. Withdrawal
   (1) Night
   (2) Day
   (3) Air
c. Delaying action

4. Tactical movements. The mechanized rifle platoon will be required to move from place to place according to operational requirements. These movements will be accomplished according to methods of tactical movement.

a. [illegible]toon as advance party
b. [illegible]on as flank guard
c. Platoon attack from march order
   (1) Light resistance
   (2) Reduction of road block

II. MAJOR COMPONENTS

A. Personnel

1. Platoon leader. The platoon leader commands his platoon and is responsible for discipline, training, welfare, control, and tactical employment of his platoon.

2. Platoon sergeant. The platoon sergeant is second in command and assists in control of the platoon, supervises ammunition resupply, and assumes command in the absence of the platoon leader.

3. Radio-telephone operator. Operates the communications equipment of platoon headquarters and assists the platoon leader as directed.

4. Three rifle squad leaders. The rifle squad leader is responsible for the discipline, training, welfare, control, and tactical employment of his squad. The squad leader commands his squad's carrier and is responsible for its positioning, movement, camouflage, and all other aspects of its employment.

5. Six fire team leaders. Each rifle squad has two fire teams. The fire team leader assists the squad leader in control of the squad by initiating action within his team as directed by the squad leader. The senior fire team leader commands the squad in the absence of the squad leader.

6. Three rifle squads. The rifle squad members employ their weapons as directed by their fire team leader. One rifleman in each squad also serves as personnel carrier driver.

7. One weapons squad leader. The weapons squad leader is responsible for the discipline, training, welfare, control, and tactical employment of his squad. He normally selects exact firing positions for squad weapons and may control their fires. He supervises the displacement of his squad.

8. One weapons squad. The weapons squad members employ their weapons as directed by the weapons squad leader. They control the fire and displacement of the weapons as directed. The senior gunner commands the squad in the absence of the squad leader. One ammunition bearer also serves as personnel carrier driver.

B. Equipment

1. Communications equipment. This consists of radios and telephones to provide intersquad and platoon-company contact for purposes of coordination and control.

2. Weapons

a. Rifles provide basic fire-and-movement and defensive element of the platoon.
b. Automatic weapons provide mobile high-volume-of-fire capability.
c. Machine guns provide stable high-volume-of-fire capability.
d. Rocket launchers provide anti-tank capability.
e. Grenades provide for destruction of automatic weapons and massed personnel.

3. Personal equipment. Individually carried equipment to provide for personal comfort and protection.

4. Vehicles. Each squad has an armored personnel carrier with a mounted machine gun. This provides means of rapid protected movement of the rifle platoon.

III. ENVIRONMENT

A. The Mechanized Infantry Rifle Platoon will conduct its missions under all conditions of terrain, weather, and lighting as determined by the operational situation.

B. The platoon will conduct its operations on command or on prearranged signals when operating as part of a larger force. When operating as a semi-independent force, the platoon leader will determine timing of operations.

C. Platoon operations will be conducted in accordance with current doctrine and tactics as applicable to the operational situation.

D. The platoon will move mounted in armored personnel carriers. It will participate in air-landed operations as required, though this may deprive it of its heavy equipment.

Appendix C

SAMPLE MATRIX OF TERMINAL AND ENABLING OBJECTIVES

The statements of objectives given in Figure C-1 are intended to illustrate an instance in which two or more terminal objectives may have a common enabling requirement. The examples were not chosen because they represented particularly ideal statements, but because they focused on an area of performance likely to be of interest to a wide range of instructors.

Enabling Objectives (EO)		Terminal Objectives (TO)			
		Facilitate discussions 1	Determine weak areas 2	Read literature 3	Attend meetings 4
Scan titles of training publications found in local libraries	1	x		x	
Subscribe to selected training publications	2	x		x	
Review articles in training publications	3	x	x	x	
Make notes of possible activities leading to professional growth	4	x		x	
Encourage supervisor to foster discussions among staff about growth	5	x			
Report results of professional meetings to other instructors	6	x			x
Develop list of "effective teaching techniques"	7		x		
Observe teaching performance of other instructors	8		x		
Invite others to evaluate your use of "effective techniques"	9		x		
Read official training directives and guidance documents	10			x	
Read brochures, flyers, etc., about professional meetings	11				x
Inform supervisor of interest in attending meetings	12				x
Make notes of concepts, techniques, etc., discussed at meetings	13				x

NOTE: See accompanying text for more complete statements of the Terminal Objectives.

Figure C-1. **Matrix of Terminal and Enabling Objectives**

More complete statements of the terminal objectives are as follows:

(1) At staff meetings, informal staff gatherings, and on other occasions when instructors might congregate, the instructor should facilitate discussions related to professional growth.

(2) From discussions with his supervisor and with his assistance, the instructor should determine areas where his teaching performance is weak and where personal improvement might be desirable.

(3) Given access to selected journals and/or magazines whose intended audience is the professional instructor, the instructor should routinely read (or scan) such publications to acquire information and suggested actions that could be taken to improve professional capabilities.

(4) When feasible in terms of teaching load, location, and cost, the instructor should attend conferences, symposia, and workshops that focus on professional problems of interest to instructors.

Appendix D

SAMPLE OBSERVATION FORM

Instructor _____ Course _____ Class _____

Student _____ Observer _____

Description of target behavior in observable terms _____

_____

Day and Date	How often did it occur this date?	Comments (include what instructor did) (Duration of event may be recorded here)
1.		
2.		
3.		
4.		
5.		
6.		
7.		

Other comments

Appendix E

VIDEOTAPING

Videotaping has proven to be a convenient and accurate way to help instructors improve their teaching skills. Since the advent of portable videotaping equipment, the filming of a classroom presentation is a simple matter that does not disrupt the students. Some events that might occur when using videotaping to modify behavior are outlined below.

I. Steps to take in modifying *instructor* behavior through videotaping.

A. The impetus for videotaping a classroom presentation would probably come from two sources.

(1) The instructor
(2) The instructor's supervisor
  (a) From live observation or evaluation
  (b) From regular videotaping of instructors

B. When the videotaping has been completed, the supervisor would view it first alone, looking for

(1) Examples of good instruction, for which the instructor can be reinforced.
(2) Examples of poor practices.
  (a) The supervisor should focus on one prominent behavior (practice).
  (b) More than one example of this behavior would be found.
  (c) A recording form might be used to keep a tally of the kinds of instructor responses. (See Figure E-1)

C. The supervisor then would review the videotape with the instructor.

(1) If this is the first time the instructor has viewed himself on videotape, he may be permitted to view the entire tape alone *if he insists*. Ordinarily, however, it is better not to let the instructor look at the tape alone.
(2) Once the concern for physical appearance and mannerisms have worn off, the instructor will be able to look at specific instructor skills and practices.
(3) The supervisor should first focus on outstanding skills, praising the instructor and saying what is right about these skills.
(4) The supervisor would then pick out one particular area for improvement.
  (a) Several instances of this would be shown on the videotape.
  (b) If a model of more appropriate behavior is available on videotape, it might be shown here for comparison.

D. The supervisor would discuss this area with the instructor, being careful:

(1) To offer solution-oriented comments.
(2) Not to be too harsh or too critical.

E. A program of improvement would be developed.

(1) The instructor should be encouraged to employ specific practices, for example:

(a) Ask at least 10 questions per period.
(b) Reinforce correct answers with enthusiasm.
(c) Call on each student at least every other day.

(2) The instructor should be encouraged to stop using certain practices, for example:

(a) Making uncomplimentary comments to students.
(b) Letting only a few students answer all questions.

F. The instructor is *personally* responsible for implementing this program.

G. After a specified period of time, a second videotape should be made of the instructor's performance.

H. The second videotape would be viewed and critiqued by the supervisor and the instructor.

II. Steps to take when modifying *student* behavior through videotaping.

A. Videotaping can be used in developing a Classroom Management (CM) program as mentioned in Area II. C. 2.

(1) If there is more than one target student, videotaping will simplify the observation task.
(2) A videotape should be made of a class session in which the focus is specific student behaviors.

B. The instructor might invite the supervisor to join in viewing the videotape.

(1) Written observations should be made.
(2) Target students for CM should be identified.
(3) Behaviors for modifications should be identified.
(4) The aspect maintaining the inappropriate behavior should be identified.
(5) Baseline performance data should be gathered.

C. Instructor develops and implements a CM program as mentioned in Area II, Function D.

RECORDING FORM
MEASURES OF CLASSROOM BEHAVIORS

DATE _____ ROOM _____

INSTRUCTOR _____ SUBJECT _____

Teacher Behaviors

1. Response of the instructor to student's answer of instructor's question.
   - A. Reinforced positively _____
   - B. Reinforced neutrally _____
   - C. Reinforced negatively _____
   - D. Instructor answers question for himself _____
   - E. Instructor repeated student's answer _____

2. Response of instructor to student's comment or question.
   - A. Reinforced positively _____
   - B. Reinforced neutrally _____
   - C. Reinforced negatively _____
   - D. Answers directly _____
   - E. Repeated student's comment _____
   - F. Redirected student's question _____

3. Instructor asks if there are any questions.
   Length of pause (student given time to think of question. _____ _____

   _____ _____ _____ _____ _____ _____ _____

4. OTHER COMMENTS _____

   _____

   _____

Observer _____

Figure E-1. **Sample Recording Form**

DISTRIBUTION LIST

1 COMDT COMD & GEN STAFF COLL ATTN ARCHIVES
1 USMA ATTN LIBRARY NY
1 COMDT ARMY AVN SCH ATTN DOI FT RUCKER
1 COMDT THE ARMOR SCH ATTN DOI FT KNOX
1 COMDT USA ARMOR SCH ATTN WPNS DEPT FT KNOX
1 COMDT USA CHAPLAIN SCH ATTN DOI FT HAMILTON
1 USA FIN SCH FT HARRISON ATTN EA
1 COMDT AG SCH ATTN EA FT HARRISON
1 COMDT USA INF SCH ATTN EA
1 HQS USA AG SCH ATTN COMDT FT HARRISON
1 COMDT THE QM SCH ATTN EA FT LEE
1 COMDT USA TRANS SCH ATTN EA
1 COMDT USA SE SIG SCH ATTN EA
1 COMDT USA AD SCH ATTN DOI
1 COMDT JAG SCH UNIV OF VA CHARLOTTESVILLE
1 EDUC CONSULTANT USMP SCH FT GORDON
1 COMDT USA ENGNR SCH ATTN EA AHBBES-EA
1 COMDT USA AVN SCH ATTN EA
1 CG USA PRIM HELICOPTER CTR/SCH & FT WOLTERS
1 DIR OF MIL INSTRUCT US MIL ACAD NY
1 COMDT USA MISLE & MUNITIONS CTR AND SCH ATTN CHF OFC OF OPS
1 COMDT US WAC SCH & CTR ATTN AJMCT
1 COMDT USA CA SCH ATTN OFC OF DOC DEV LIT & PLNS
1 COMDT USA FLD ARTY SCH ATTN EA
1 COMDT USA AD SCH ATTN AKBAAS-DL-EA